



## ADVISORY COMMITTEE COMMENT FORM FOR PROPOSED CODE CHANGES (This form must be submitted electronically)

### IRC-4, MR1309.0010

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### Proposed Code Change – Language

#### **~~1309.0010 ADOPTION OF INTERNATIONAL RESIDENTIAL CODE (IRC) BY REFERENCE.~~**

**~~Subp. 4. Seismic or earthquake provisions.~~** Any seismic or earthquake provisions and any references to them are deleted and are not included in this code.

**R301.1 Application.** Buildings and structures, and all parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, and wind loads ~~and seismic loads~~ as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation. Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

Delete the following footnote:

TABLE R301.2(1)  
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD	WIND DESIGN		<del>SEISMIC DESIGN CATEGORY</del>	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP <sup>a</sup>	ICE BARRIER UNDERLAYMENT REQUIRED <sup>b</sup>	FLOOD HAZARDS <sup>c</sup>	AIR FREEZING INDEX <sup>d</sup>	MEAN ANNUAL TEMP <sup>e</sup>
	Speed <sup>f</sup> (mph)	Topographic effects <sup>g</sup>		Weathering <sup>a</sup>	Frost line depth <sup>h</sup>	Termite <sup>c</sup>					

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., "negligible," "moderate" or "severe") for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

b. The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(4)]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The outdoor design dry bulb temperature shall be selected from the columns of 97½ percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.

~~f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.~~

g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FBPMs or other flood hazard map adopted by the authority having jurisdiction, as amended.

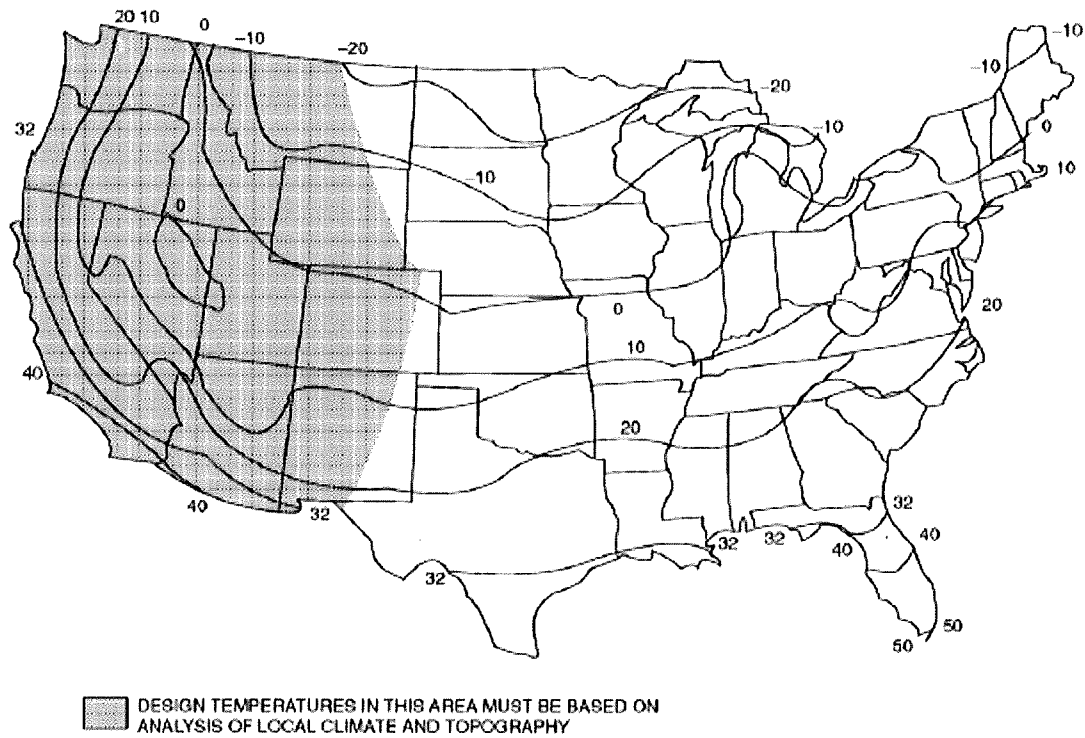
h. In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF: days) from Figure R403.3(2) or from the 100-year (90%) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°)" at [www.ncdc.noaa.gov/lpf.html](http://www.ncdc.noaa.gov/lpf.html).

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)" at [www.ncdc.noaa.gov/lpf.html](http://www.ncdc.noaa.gov/lpf.html).

k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

Delete the following figure:



For SI:  $^{\circ}\text{C} = [(^{\circ}\text{F}) - 32]/1.8$

FIGURE R301.2(1)  
ISOLINES OF THE 97 $\frac{1}{2}$  PERCENT WINTER (DECEMBER, JANUARY AND FEBRUARY) DESIGN TEMPERATURES ( $^{\circ}\text{F}$ )

Delete the following figure:

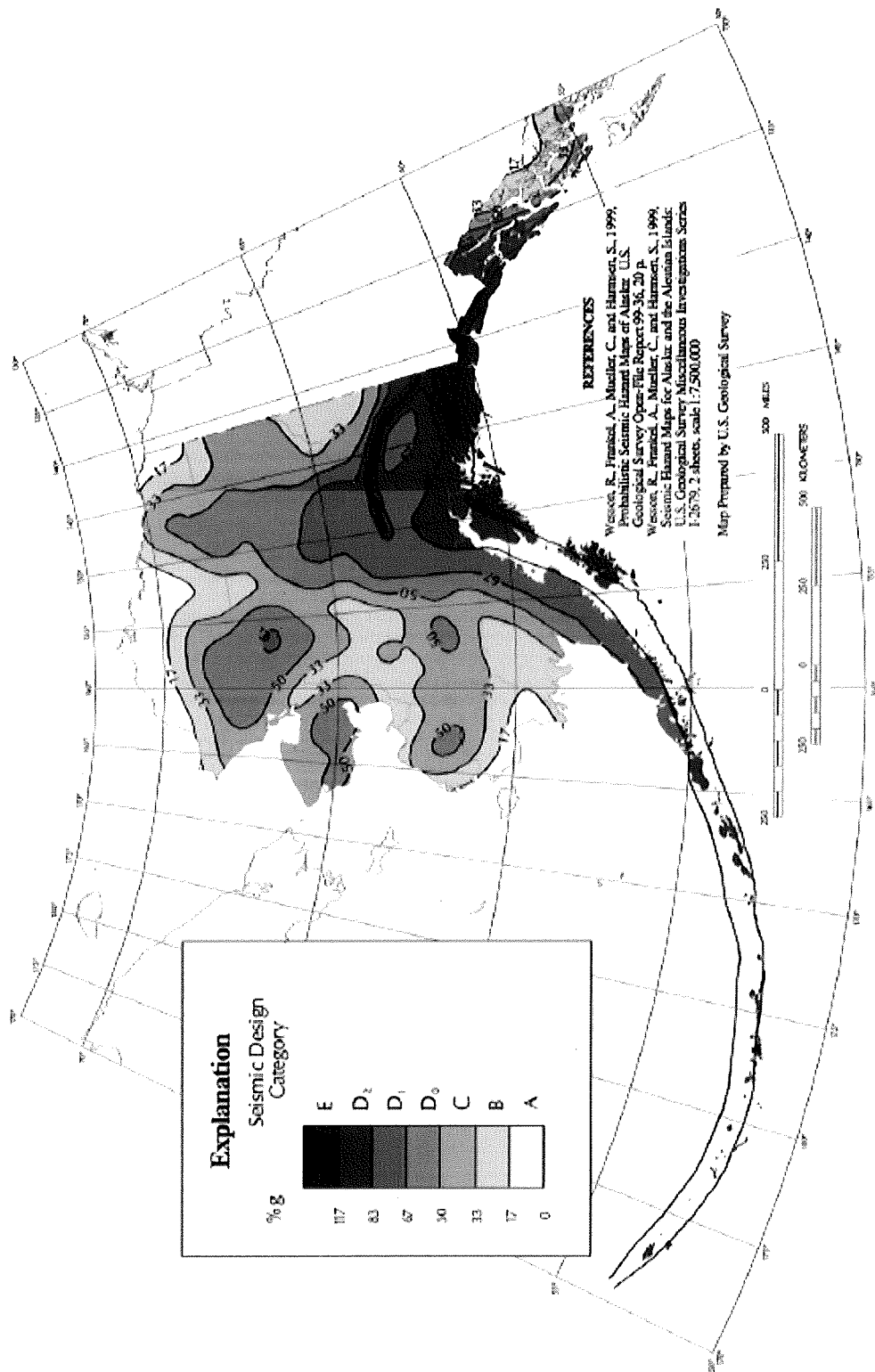


FIGURE R301.2(2)  
SEISMIC DESIGN CATEGORIES—SITE CLASS D  
(continued)

For SI: 1 mile = 1.61 km.

Delete the following figure:

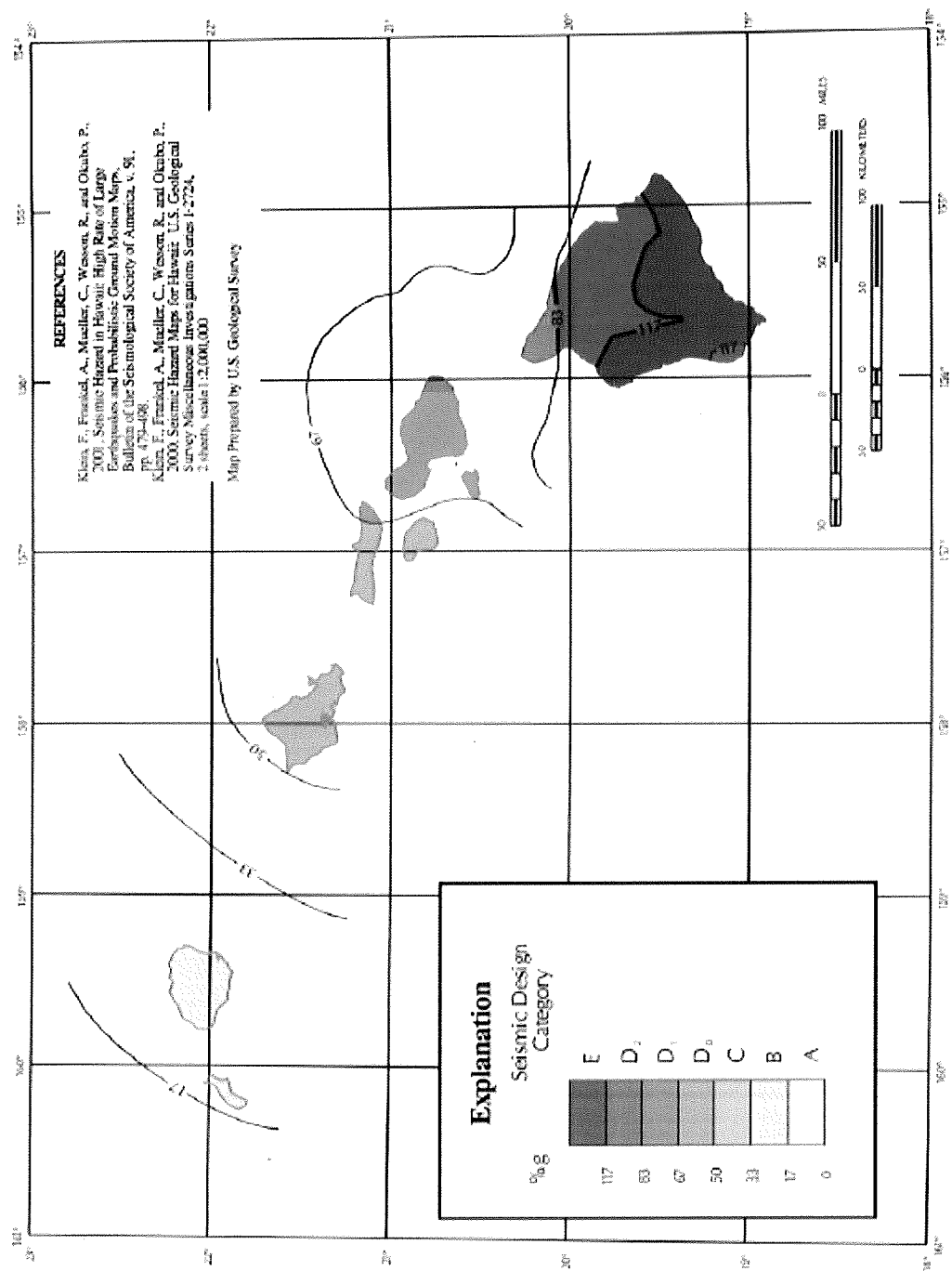


FIGURE R301.2(2)—continued  
SEISMIC DESIGN CATEGORIES—SITE CLASS D  
(continued)

Delete the following figure:

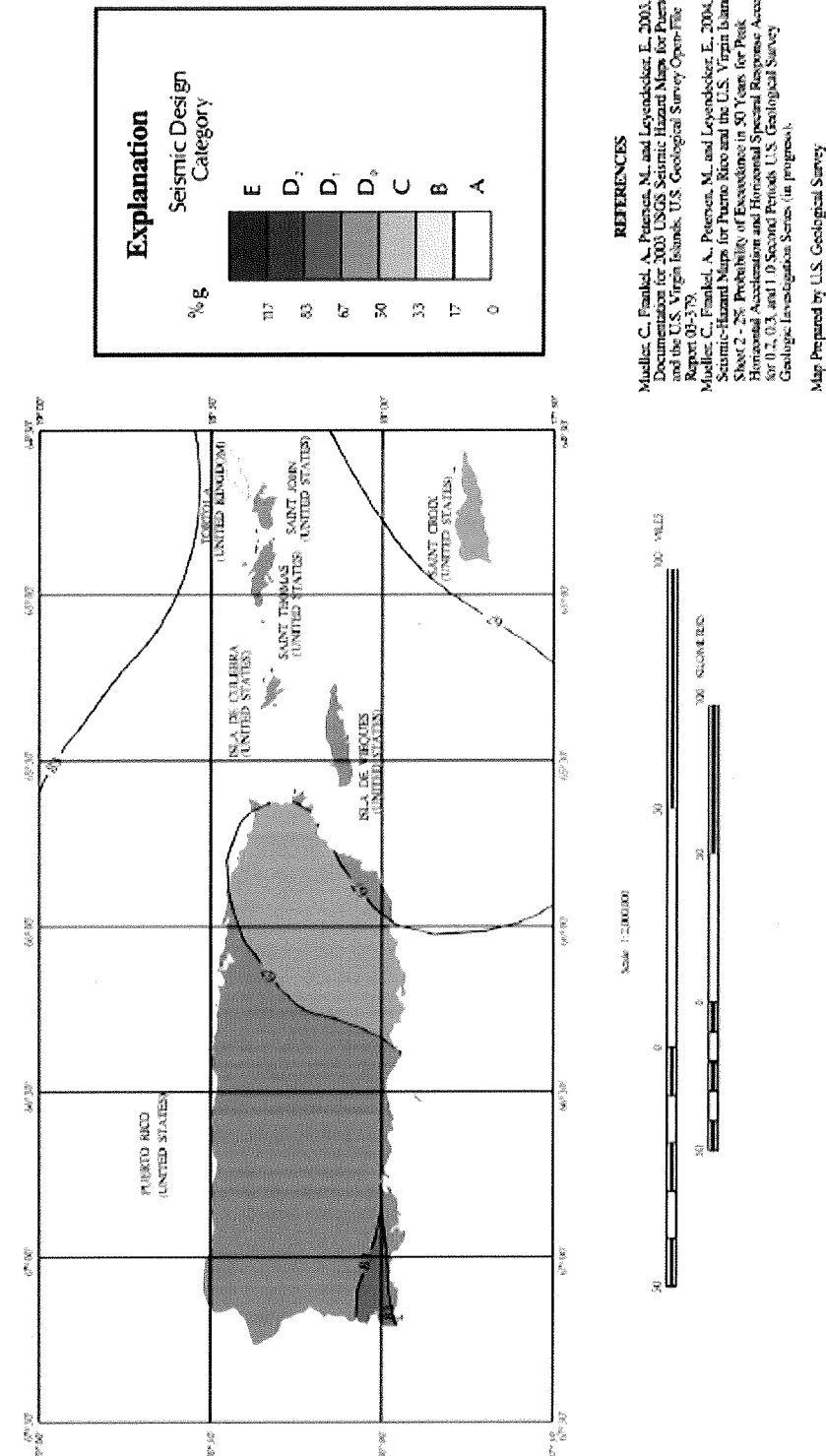


FIGURE R301.2(2)—Continued  
SEISMIC DESIGN CATEGORIES—SITE CLASS D  
(continued)

Delete the following figure:

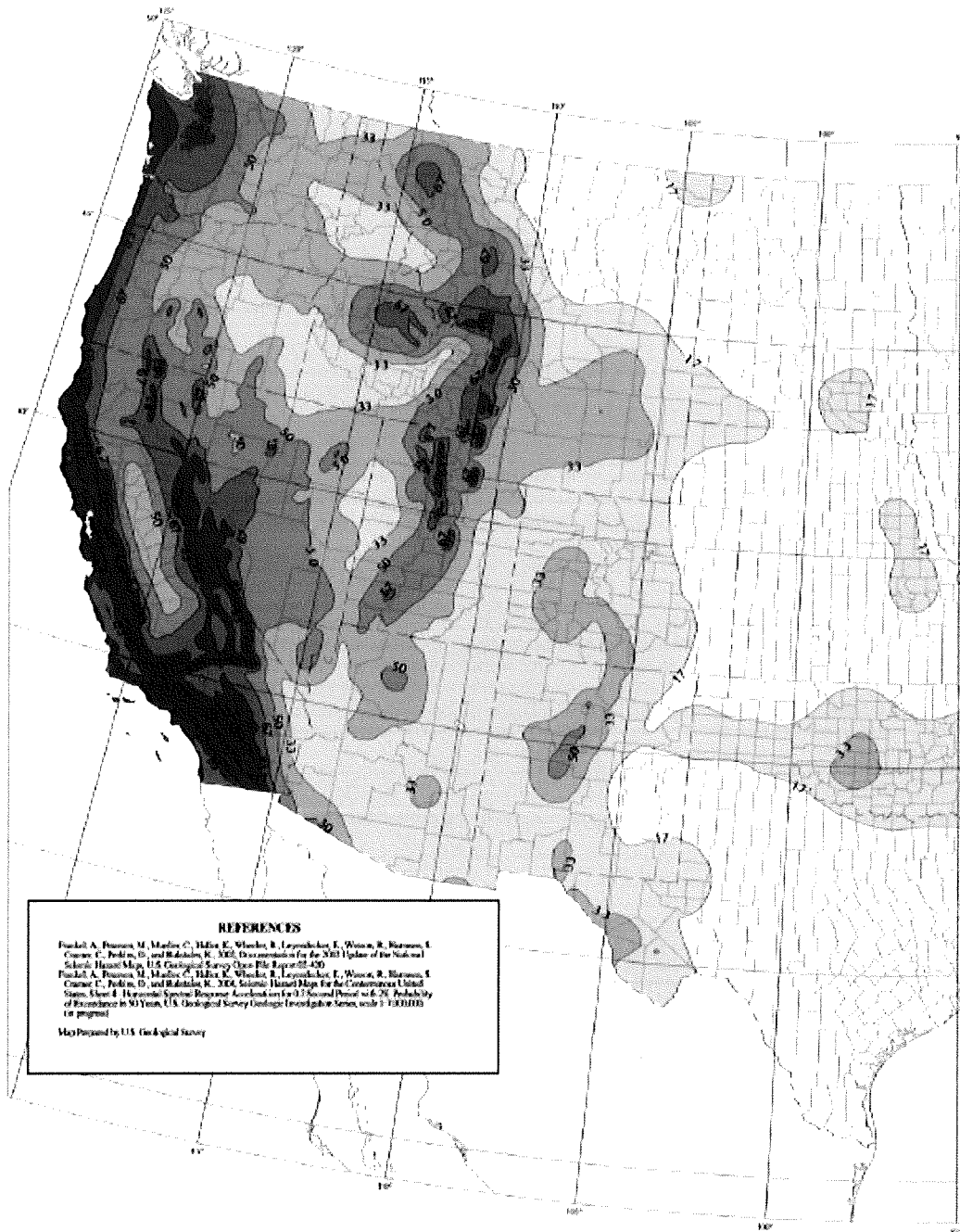


FIGURE R301.2(2)—continued  
SEISMIC DESIGN CATEGORIES—SITE CLASS D

(continued)

Delete the following figure:

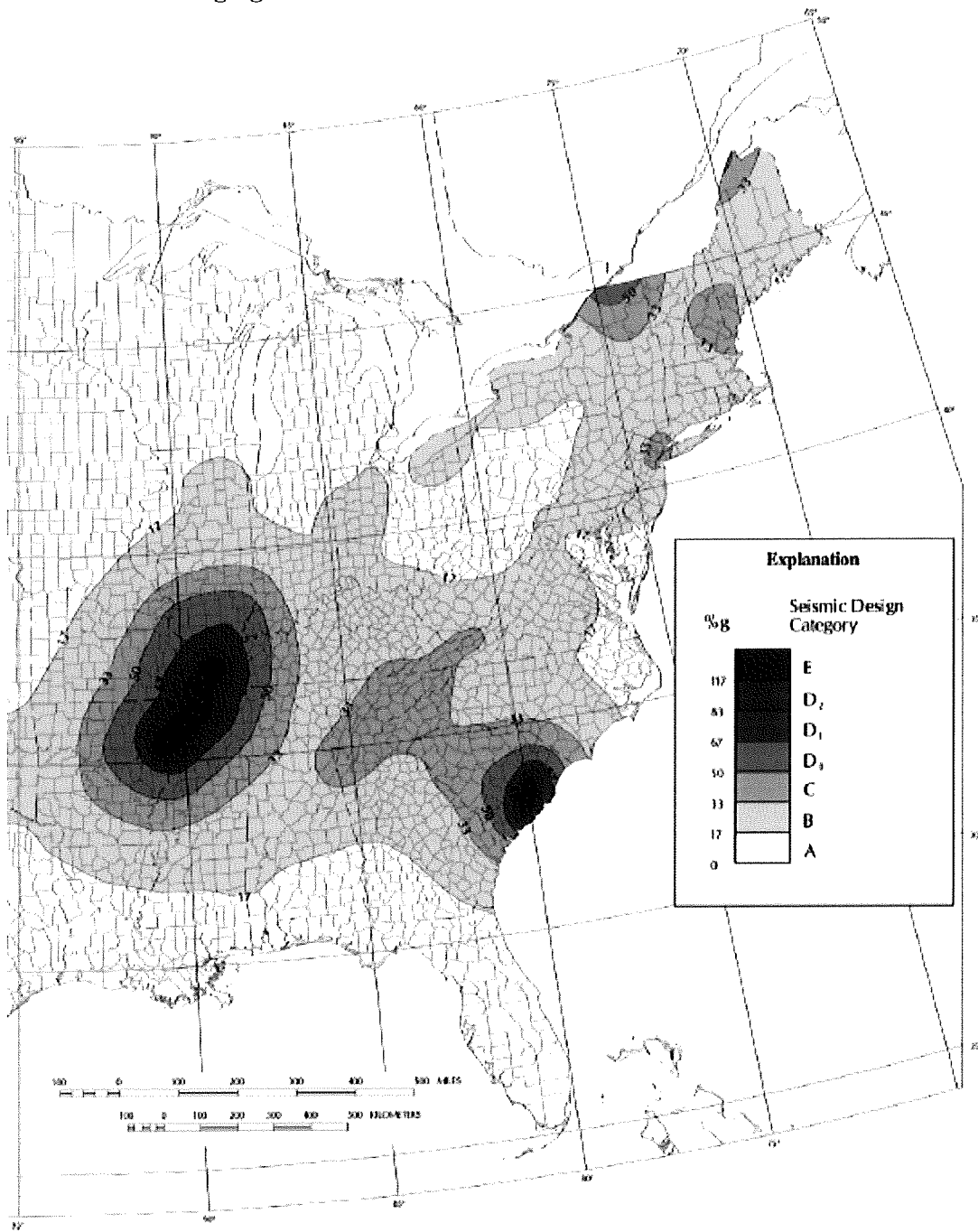


FIGURE R301.2(2)—continued  
SEISMIC DESIGN CATEGORIES—SITE CLASS D





Delete the following figure:

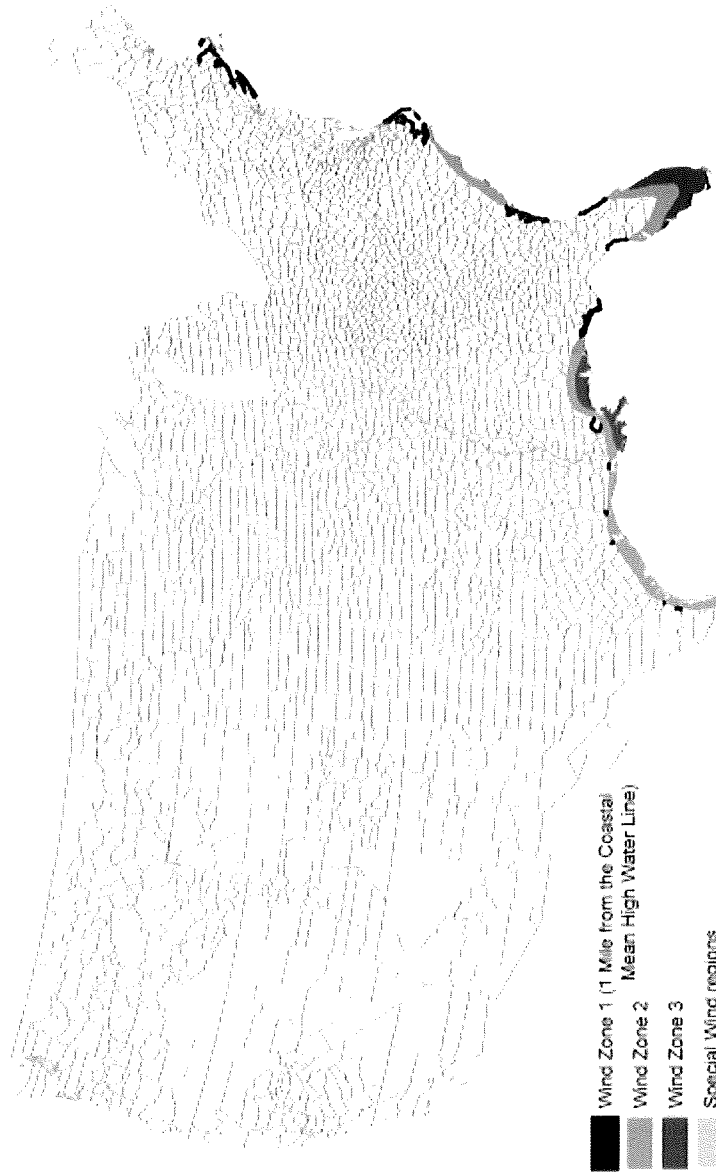


FIGURE R301.2(4)C  
WIND-BORNE DEBRIS REGIONS

Delete the following figure:

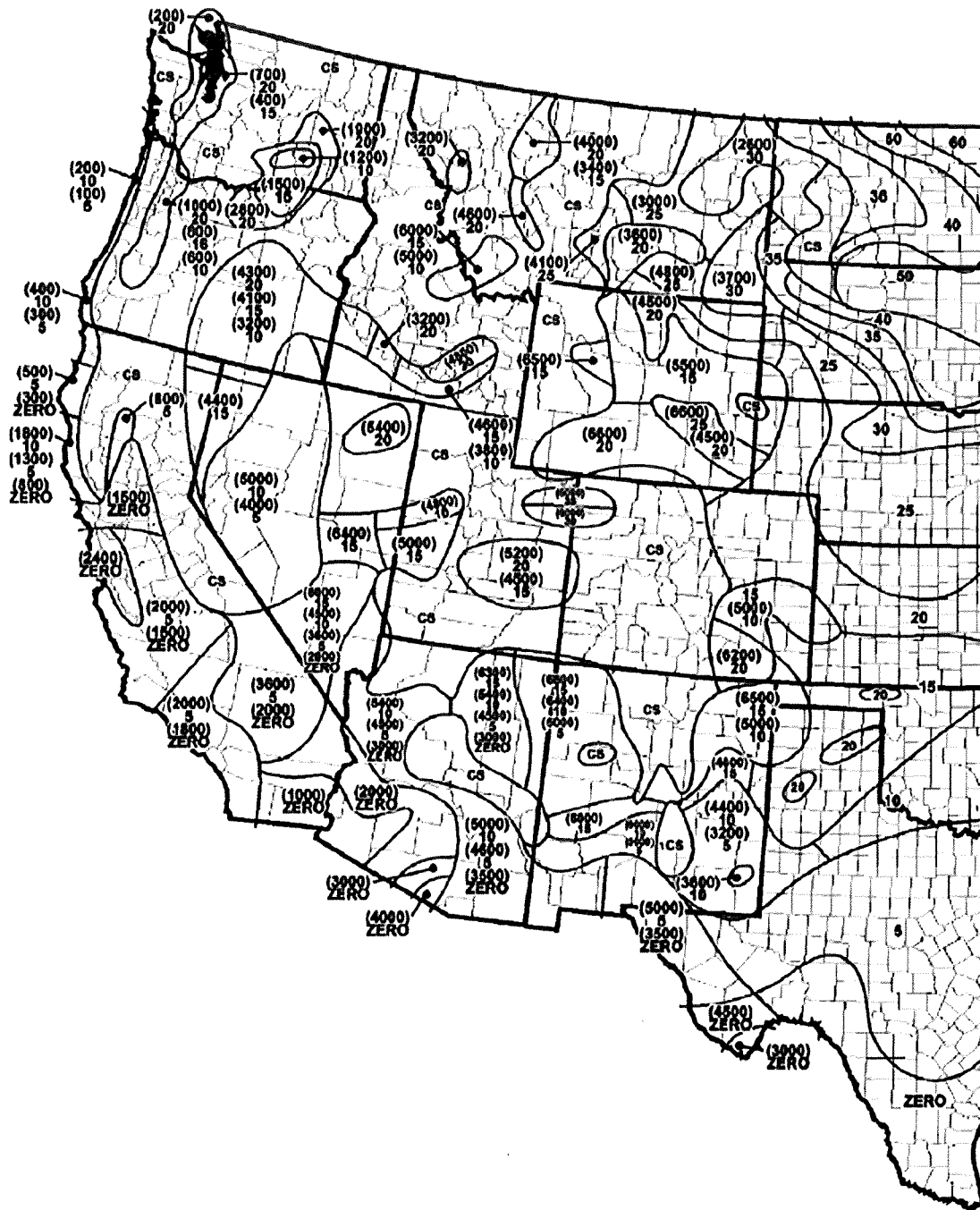


FIGURE R301.2(5)  
GROUND SNOW LOADS,  $P_g$  FOR THE UNITED STATES (lb/ft<sup>2</sup>)  
(continued)

**Delete the following figure:**



For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

FIGURE R301.2(5)—continued  
GROUND SNOW LOADS,  $P_g$ , FOR THE UNITED STATES (lb/ft<sup>2</sup>)

**R301.2.1 Wind design criteria.** Buildings and portions thereof shall be constructed in accordance with the wind provisions of this code using the basic wind speed in Table R301.2(1) as determined from Figure R301.2(4)A. ~~The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1.~~ Where different construction methods and structural materials are used for various portions of a building, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) shall be used to determine design load performance requirements for wall coverings, curtain walls, roof coverings, exterior windows, skylights, garage doors and exterior doors. Asphalt shingles shall be designed for wind speeds in accordance with Section R905.2.4. A continuous load path shall be provided to transmit the applicable uplift forces in Section R802.11.1 from the roof assembly to the foundation.

**~~R301.2.1.1 Wind limitations and wind design required.~~** ~~The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s).~~

**Exceptions:**

- ~~1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.~~
- ~~2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R613.~~

~~In regions where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed shown on Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s), the design of buildings for wind loads shall be in accordance with one or more of the following methods:~~

- ~~1. AF&PA Wood Frame Construction Manual (WFCM); or~~
- ~~2. ICC Standard for Residential Construction in High Wind Regions (ICC 600); or~~
- ~~3. ASCE Minimum Design Loads for Buildings and Other Structures (ASCE 7); or~~
- ~~4. AISI Standard for Cold-Formed Steel Framing—Prescriptive Method For One and Two-Family Dwellings (AISI S230); or~~
- ~~5. International Building Code.~~

~~The elements of design not addressed by the methods in Items 1 through 5 shall be in accordance with the provisions of this code. When ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the International Building Code shall be used.~~

**R301.2.1.2 Protection of openings.** Exterior glazing in buildings located in windborne debris regions shall be protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirements of the Large Missile Test of ASTM E 1996 and ASTM E 1886 referenced therein. The applicable wind zones for establishing missile types in ASTM E 1996 are shown on Figure R301.2(4)C. Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact resisting standard or ANSI/DASMA 115.

**Exception:** Wood structural panels with a minimum thickness of 7/16 inch (11 mm) and a maximum span of 8 feet (2438 mm) shall be permitted for opening protection in one and two-story buildings. Panels shall be precut and attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.2(2) or ASCE 7, with the permanent corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.2.1.2 is permitted for buildings with a mean roof height of 33 feet (10 058 mm) or less where located in Wind Zones 1 and 2 in accordance with Figure R301.2(4)C.

Delete the following Table:

TABLE R301.2.1.2  
WINDBORNE DEBRIS PROTECTION FASTENING SCHEDULE  
FOR WOOD STRUCTURAL PANELS<sup>a, b, c, d</sup>

FASTENER TYPE	FASTENER SPACING (inches) <sup>a, b</sup>		
	Panel span ≤ 4 feet	4 feet < panel span ≤ 6 feet	6 feet < panel span ≤ 8 feet
No. 8 wood screw based anchor with 2-inch embedment length	16	10	8
No. 10 wood screw based anchor with 2-inch embedment length	16	12	9
1/4-inch lag screw based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N,  
1 mile per hour = 0.447 m/s.

- This table is based on 130 mph wind speeds and a 33-foot mean roof height.
- Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located a minimum of 1 inch from the edge of the panel.
- Anchors shall penetrate through the exterior wall covering with an embedment length of 2 inches minimum into the building frame. Fasteners shall be located a minimum of 2 1/2 inches from the edge of concrete block or concrete.
- Where panels are attached to masonry or masonry/stucco, they shall be attached using vibration resistant anchors having a minimum ultimate withdrawal capacity of 1500 pounds.

**R301.2.2 Seismic provisions.** The seismic provisions of this code shall apply as follows:

- Townhouses in Seismic Design Categories C, D0, D1 and D2.
- Detached one and two-family dwellings in Seismic Design Categories, D0, D1 and D2.

**R301.2.2.1 Determination of seismic design category.** Buildings shall be assigned a seismic design category in accordance with Figure R301.2(2).

**R301.2.2.1.1 Alternate determination of seismic design category.** The seismic design categories and corresponding short period design spectral response accelerations,  $S_{DS}$  shown in Figure R301.2(2) are based on soil Site Class D, as defined in Section 1613.5.2 of the *International Building Code*. If soil conditions are other than Site Class D, the short period design spectral response accelerations,  $S_{DS}$ , for a site can be determined according to Section 1613.5 of the *International Building Code*. The value of  $S_{DS}$  determined according to Section 1613.5 of the *International Building Code* is permitted to be used to set the seismic design category according to Table R301.2.2.1.1, and to interpolate between values in Tables R602.10.1.2(2), R603.9.2(1) and other seismic design requirements of this code.

Delete the following table:

TABLE R301.2.2.1.1  
SEISMIC DESIGN CATEGORY DETERMINATION

CALCULATED $S_{DS}$	SEISMIC DESIGN CATEGORY
$S_{DS} \leq 0.17g$	A
$0.17g < S_{DS} \leq 0.33g$	B
$0.33g < S_{DS} \leq 0.50g$	C
$0.50g < S_{DS} \leq 0.67g$	D <sub>0</sub>
$0.67g < S_{DS} \leq 0.83g$	D <sub>1</sub>
$0.83g < S_{DS} \leq 1.17g$	D <sub>2</sub>
$1.17g < S_{DS}$	E

**R301.2.2.1.2 Alternative determination of Seismic Design Category E.** Buildings located in Seismic Design Category E in accordance with Figure R301.2(2) are permitted to be reclassified as being in Seismic Design Category D2 provided one of the following is done:

- A more detailed evaluation of the seismic design category is made in accordance with the provisions and maps of the *International Building Code*. Buildings located in Seismic Design Category E per Table R301.2.2.1.1, but located

in Seismic Design Category D per the *International Building Code*, may be designed using the Seismic Design Category D2 requirements of this code.

2. Buildings located in Seismic Design Category E that conform to the following additional restrictions are permitted to be constructed in accordance with the provisions for Seismic Design Category D2 of this code:

- 2.1. All exterior shear wall lines or *braced wall panels* are in one plane vertically from the foundation to the uppermost story.
- 2.2. Floors shall not cantilever past the exterior walls.
- 2.3. The building is within all of the requirements of Section R301.2.2.2.5 for being considered as regular.

**R301.2.2.2 Seismic Design Category C.** Structures assigned to Seismic Design Category C shall conform to the requirements of this section.

**R301.2.2.2.1 Weights of materials.** Average dead loads shall not exceed 15 pounds per square foot (720 Pa) for the combined roof and ceiling assemblies (on a horizontal projection) or 10 pounds per square foot (480 Pa) for floor assemblies, except as further limited by Section R301.2.2. Dead loads for walls above *grade* shall not exceed:

1. Fifteen pounds per square foot (720 Pa) for exterior light-frame wood walls.
2. Fourteen pounds per square foot (670 Pa) for exterior light-frame cold-formed steel walls.
3. Ten pounds per square foot (480 Pa) for interior light-frame wood walls.
4. Five pounds per square foot (240 Pa) for interior light-frame cold-formed steel walls.
5. Eighty pounds per square foot (3830 Pa) for 8-inch-thick (203 mm) masonry walls.
6. Eighty-five pounds per square foot (4070 Pa) for 6-inch-thick (152 mm) concrete walls.
7. Ten pounds per square foot (480 Pa) for SIP walls.

**Exceptions:**

1. Roof and ceiling dead loads not exceeding 25 pounds per square foot (1190 Pa) shall be permitted provided the wall bracing amounts in Chapter 6 are increased in accordance with Table R301.2.2.2.1.
2. Light-frame walls with stone or masonry veneer shall be permitted in accordance with the provisions of Sections R702.1 and R703.
3. Fireplaces and chimneys shall be permitted in accordance with Chapter 10.

Delete the following table:

TABLE R301.2.2.2.1  
WALL BRACING ADJUSTMENT FACTORS BY  
ROOF COVERING DEAD LOAD\*

WALL SUPPORTING	ROOF/CEILING DEAD LOAD	
	15 psf or less	25 psf
Roof only	1.0	1.2
Roof plus one or two stories	1.0	1.1

For SI: 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

**R301.2.2.2.2 Stone and masonry veneer.** Anchored stone and masonry veneer shall comply with the requirements of Sections R702.1 and R703.

**R301.2.2.2.3 Masonry construction.** Masonry construction shall comply with the requirements of Section R606.12.

**R301.2.2.2.4 Concrete construction.** Detached one- and two-family *dwelling*s with exterior above-*grade* concrete walls shall comply with the requirements of Section R611, PCA 100 or shall be designed in accordance with ACI 318. *Townhouses* with above-*grade* exterior concrete walls shall comply with the requirements of PCA 100 or shall be designed in accordance with ACI 318.

**R301.2.2.2.5 Irregular buildings.** The seismic provisions of this code shall not be used for irregular structures located in Seismic Design Categories C, D0, D1 and D2. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. When the forces associated with the irregularity are resisted by a structural system designed in accordance with accepted engineering practice, design of the remainder of the building shall be permitted using the provisions of this code. A building or portion of a building shall be considered to be irregular when one or more of the following conditions occur:

1. When exterior shear wall lines or *braced wall panels* are not in one plane vertically from the foundation to the uppermost *story* in which they are required.

**Exception:** For wood light frame construction, floors with cantilevers or setbacks not exceeding four times the nominal depth of the wood floor joists are permitted to support *braced wall panels* that are out of plane with *braced wall panels* below provided that:

1. Floor joists are nominal 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) on center;
2. The ratio of the back span to the cantilever is at least 2 to 1;
3. Floor joists at ends of *braced wall panels* are doubled;
4. For wood frame construction, a continuous rim joist is connected to ends of all cantilever joists. When spliced, the rim joists shall be spliced using a galvanized metal tie not less than 0.058 inch (1.5 mm) (16 gage) and 1 1/2 inches (38 mm) wide fastened with six 16d nails on each side of the splice or a block of the same size as the rim joist of sufficient length to fit securely between the joist space at which the splice occurs fastened with eight 16d nails on each side of the splice; and
5. Gravity loads carried at the end of cantilevered joists are limited to uniform wall and roof loads and the reactions from headers having a span of 8 feet (2438 mm) or less.

2. When a section of floor or roof is not laterally supported by shear walls or *braced wall lines* on all edges.

**Exception:** Portions of floors that do not support shear walls or *braced wall panels* above, or roofs, shall be permitted to extend no more than 6 feet (1829 mm) beyond a shear wall or *braced wall line*.

3. When the end of a *braced wall panel* occurs over an opening in the wall below and ends at a horizontal distance greater than 1 foot (305 mm) from the edge of the opening. This provision is applicable to shear walls and *braced wall panels* offset in plane and to *braced wall panels* offset out of plane as permitted by the exception to Item 1 above.

**Exception:** For wood light frame wall construction, one end of a *braced wall panel* shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) wide in the wall below provided that the opening includes a header in accordance with the following:

1. The building width, loading condition and framing member species limitations of Table R502.5(1) shall apply; and
2. Not less than one 2 × 12 or two 2 × 10 for an opening not more than 4 feet (1219 mm) wide; or
3. Not less than two 2 × 12 or three 2 × 10 for an opening not more than 6 feet (1829 mm) wide; or
4. Not less than three 2 × 12 or four 2 × 10 for an opening not more than 8 feet (2438 mm) wide; and
5. The entire length of the *braced wall panel* does not occur over an opening in the wall below.

4. When an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.

5. When portions of a floor level are vertically offset.

**Exceptions:**

1. Framing supported directly by continuous foundations at the perimeter of the building;
2. For wood light frame construction, floors shall be permitted to be vertically offset when the floor framing is lapped or tied together as required by Section R502.6.1.

6. When shear walls and *braced wall lines* do not occur in two perpendicular directions.

7. When stories above *grade* plane partially or completely braced by wood wall framing in accordance with Section R602 or steel wall framing in accordance with Section R603 include masonry or concrete construction.

**Exception:** Fireplaces, chimneys and masonry veneer as permitted by this code. When this irregularity applies, the entire *story* shall be designed in accordance with accepted engineering practice.

**R301.2.2.3 Seismic Design Categories D0, D1 and D2.** Structures assigned to Seismic Design Categories D0, D1 and D2 shall conform to the requirements for Seismic Design Category C and the additional requirements of this section.

**R301.2.2.3.1 Height limitations.** Wood framed buildings shall be limited to three stories above *grade* plane or the limits given in Table R602.10.3(3). Cold formed, steel framed buildings shall be limited to less than or equal to three stories above *grade* plane in accordance with AISI S230. Mezzanines as defined in Section R202 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above *grade* plane.

**R301.2.2.3.2 Stone and masonry veneer.** Anchored stone and masonry veneer shall comply with the requirements of Sections R702.1 and R703.

**~~R301.2.2.3.3 Masonry construction.~~** ~~Masonry construction in Seismic Design Categories D0 and D1 shall comply with the requirements of Section R606.12.1. Masonry construction in Seismic Design Category D2 shall comply with the requirements of Section R606.12.4.~~

**~~R301.2.2.3.4 Concrete construction.~~** ~~Buildings with exterior above-grade concrete walls shall comply with PCA 100 or shall be designed in accordance with ACI 318.~~

**~~R301.2.2.3.5 Cold-formed steel framing in Seismic Design Categories D0, D1 and D2.~~** ~~In Seismic Design Categories D0, D1 and D2 in addition to the requirements of this code, cold-formed steel framing shall comply with the requirements of AISI S230.~~

**~~R301.2.2.3.6 Masonry chimneys.~~** ~~Masonry chimneys shall be reinforced and anchored to the building in accordance with Sections R1003.3 and R1003.4.~~

**~~R301.2.2.3.7 Anchorage of water heaters.~~** ~~Water heaters shall be anchored against movement and overturning in accordance with Section M1307.2.~~

**~~R301.2.2.4 Seismic Design Category E.~~** ~~Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the *International Building Code*, except when the seismic design category is reclassified to a lower seismic design category in accordance with Section R301.2.2.1. Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.~~

**R401.1 Application.** The provisions of this chapter shall control the design and construction of the foundation and foundation spaces for all buildings. In addition to the provisions of this chapter, the design and construction of foundations in flood hazard areas as established by Table R301.2(1) shall meet the provisions of Section R322. Wood foundations shall be designed and installed in accordance with AF&PA PWF.

**Exception:** The provisions of this chapter shall be permitted to be used for wood foundations only in the following situations:

1. In buildings that have no more than two floors and a roof.
2. When interior *basement* and foundation walls are constructed at intervals not exceeding 50 feet (15 240 mm).

Wood foundations in Seismic Design Category D0, D1 or D2 shall be designed in accordance with accepted engineering practice.

**~~R403.1.2 Continuous footing in Seismic Design Categories D0, D1 and D2.~~** ~~The *braced wall panels* at exterior walls of buildings located in Seismic Design Categories D0, D1 and D2 shall be supported by continuous footings. All required interior *braced wall panels* in buildings with plan dimensions greater than 50 feet (15 240 mm) shall also be supported by continuous footings.~~

**~~R403.1.3 Seismic reinforcing.~~** ~~Concrete footings located in Seismic Design Categories D0, D1 and D2, as established in Table R301.2(1), shall have minimum reinforcement. Bottom reinforcement shall be located a minimum of 3 inches (76 mm) clear from the bottom of the footing.~~

~~In Seismic Design Categories D0, D1 and D2 where a construction joint is created between a concrete footing and a stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing, have a standard hook and extend a minimum of 14 inches (357 mm) into the stem wall.~~

~~In Seismic Design Categories D0, D1 and D2 where a grouted masonry stem wall is supported on a concrete footing and stem wall, a minimum of one No. 4 bar shall be installed at not more than 4 feet (1219 mm) on center. The vertical bar shall extend to 3 inches (76 mm) clear of the bottom of the footing and have a standard hook.~~

~~In Seismic Design Categories D0, D1 and D2 masonry stem walls without solid grout and vertical reinforcing are not permitted.~~

**Exception:** ~~In detached one- and two-family *dwelling*s which are three stories or less in height and constructed with stud bearing walls, isolated plain concrete footings, supporting columns or pedestals are permitted.~~



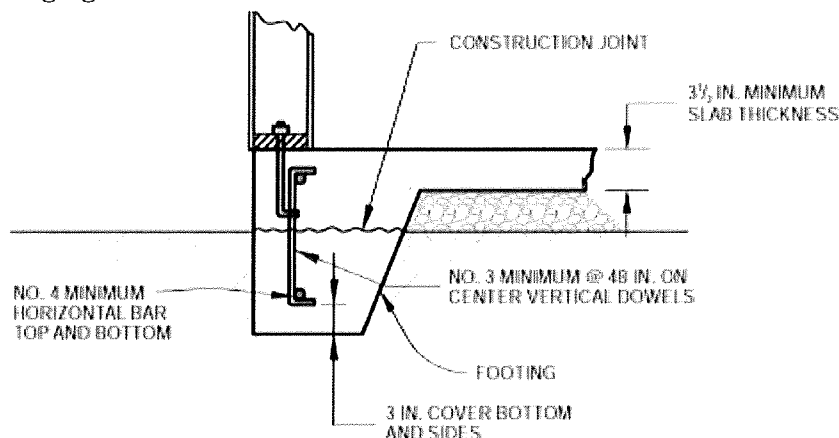
**R403.1.3.1 Foundations with stem walls.** Foundations with stem walls shall have installed a minimum of one No. 4 bar within 12 inches (305 mm) of the top of the wall and one No. 4 bar located 3 inches (76 mm) to 4 inches (102 mm) from the bottom of the footing.

**R403.1.3.2 Slabs on ground with turned down footings.** Slabs on ground with turned down footings shall have a minimum of one No. 4 bar at the top and the bottom of the footing.

**Exception:** For slabs on ground cast monolithically with the footing, locating one No. 5 bar or two No. 4 bars in the middle third of the footing depth shall be permitted as an alternative to placement at the footing top and bottom.

Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be provided in accordance with Figure R403.1.3.2. Standard hooks shall comply with Section R611.5.4.5.

Delete the following figure:



For SB: 1 inch = 25.4 mm.

FIGURE R403.1.3.2  
DOWELS FOR SLABS-ON-GROUND WITH TURNED-DOWN FOOTINGS

**R403.1.4.2 Seismic conditions.** In Seismic Design Categories D0, D1 and D2, interior footings supporting bearing or bracing walls and cast monolithically with a slab on grade shall extend to a depth of not less than 12 inches (305 mm) below the top of the slab.

**R403.1.6.1 Foundation anchorage in Seismic Design Categories C, D0, D1 and D2.** In addition to the requirements of Section R403.1.6, the following requirements shall apply to wood light-frame structures in Seismic Design Categories D0, D1 and D2 and wood light-frame townhouses in Seismic Design Category C.

1. Plate washers conforming to Section R602.11.1 shall be provided for all anchor bolts over the full length of required braced wall lines except where approved anchor straps are used. Properly sized cut washers shall be permitted for anchor bolts in wall lines not containing braced wall panels.
2. Interior braced wall plates shall have anchor bolts spaced at not more than 6 feet (1829 mm) on center and located within 12 inches (305 mm) of the ends of each plate section when supported on a continuous foundation.
3. Interior bearing wall sole plates shall have anchor bolts spaced at not more than 6 feet (1829 mm) on center and located within 12 inches (305 mm) of the ends of each plate section when supported on a continuous foundation.
4. The maximum anchor bolt spacing shall be 4 feet (1219 mm) for buildings over two stories in height.
5. Stepped cripple walls shall conform to Section R602.11.2.
6. Where continuous wood foundations in accordance with Section R404.2 are used, the force transfer shall have a capacity equal to or greater than the connections required by Section R602.11.1 or the braced wall panel shall be connected to the wood foundations in accordance with the braced wall panel to floor fastening requirements of Table R602.3(1).

**R404.1.1.1 Masonry foundation walls.** Concrete masonry and clay masonry foundation walls shall be constructed as set forth in Table R404.1.1(1), R404.1.1(2), R404.1.1(3) or R404.1.1(4) and shall also comply with applicable provisions of Sections R606, R607 and R608. In buildings assigned to Seismic Design Categories D0, D1 and D2, concrete masonry and clay masonry foundation walls shall also comply with Section R404.1.4.1. Rubble stone masonry foundation walls

shall be constructed in accordance with Sections R404.1.8 and R607.2.2. Rubble stone masonry walls shall not be used in Seismic Design Categories D0, D1 and D2.

**R404.1.2.2 Reinforcement for foundation walls.** Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table R404.1.2(1). Vertical reinforcement shall be provided in accordance with Table R404.1.2(2), R404.1.2(3), R404.1.2(4), R404.1.2(5), R404.1.2(6), R404.1.2(7) or R404.1.2(8). Vertical reinforcement for flat *basement* walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table R404.1.2(9). For *basement* walls supporting above grade concrete walls, vertical reinforcement shall be the greater of that required by Tables R404.1.2(2) through R404.1.2(8) or by Section R611.6 for the above-grade wall. In buildings assigned to Seismic Design Category D0, D1 or D2, concrete foundation walls shall also comply with Section R404.1.4.2.

**R404.1.2.3.1 Compressive strength.** The minimum specified compressive strength of concrete,  $f'_c$ , shall comply with Section R402.2 and shall be not less than 2,500 psi (17.2 MPa) at 28 days in buildings assigned to Seismic Design Category A, B or C and 3000 psi (20.5 MPa) in buildings assigned to Seismic Design Category D0, D1 or D2.

**R404.1.2.3.7.1 Steel reinforcement.** Steel reinforcement shall comply with the requirements of ASTM A 615, A 706, or A 996. ASTM A 996 bars produced from rail steel shall be Type R. In buildings assigned to Seismic Design Category A, B or C, the The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). In buildings assigned to Seismic Design Category D0, D1 or D2, reinforcing steel shall comply with the requirements of ASTM A 706 for low alloy steel with a minimum yield strength of 60,000 psi (Grade 60) (414 MPa).

**R404.1.2.4 Requirements for Seismic Design Category C.** Concrete foundation walls supporting above grade concrete walls in townhouses assigned to Seismic Design Category C shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.2).

#### **R404.1.4 Seismic Design Category D0, D1 or D2.**

**R404.1.4.1 Masonry foundation walls.** In addition to the requirements of Table R404.1.1(1) plain masonry foundation walls in buildings assigned to Seismic Design Category D0, D1 or D2, as established in Table R301.2(1), shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 3 (No. 10) bar located a maximum of 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls in buildings assigned to Seismic Design Category D0, D1 or D2, as established in Table R301.2(1), supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.1(2), R404.1.1(3) or R404.1.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

**R404.1.4.2 Concrete foundation walls.** In buildings assigned to Seismic Design Category D0, D1 or D2, as established in Table R301.2(1), concrete foundation walls that support light frame walls shall comply with this section, and concrete foundation walls that support above grade concrete walls shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.2). In addition to the horizontal reinforcement required by Table R404.1.2(1), plain concrete walls supporting light frame walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet, 6 inches (1372 mm).

Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table R404.1.2(1), and vertical reinforcement in accordance with Table R404.1.2(2), R404.1.2(3), R404.1.2(4), R404.1.2(5), R404.1.2(6), R404.1.2(7) or R404.1.2(8). Where Tables R404.1.2(2) through R404.1.2(8) permit plain

concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.

**R404.1.5.3 Pier and curtain wall foundations.** Use of pier and curtain wall foundations shall be permitted to support light-frame construction not more than two stories in height, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings placed integrally with the exterior wall footings.
2. The minimum actual thickness of a load-bearing masonry wall shall be not less than 4 inches (102 mm) nominal or 33/8 inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced in accordance with Section R606.9.
3. Piers shall be constructed in accordance with Section R606.6 and Section R606.6.1, and shall be bonded into the load-bearing masonry wall in accordance with Section R608.1.1 or R608.1.1.2.
4. The maximum height of a 4-inch (102 mm) load bearing masonry foundation wall supporting wood-frame walls and floors shall not be more than 4 feet (1219 mm).
5. Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.5(1), or as specified by engineered design accepted by the *building official*.
6. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry or 12 inches (305 mm) for hollow masonry.
7. In Seismic Design Categories D0, D1 and D2, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No. 9 gage wires spaced not less than 6 inches (152 mm) or one 1/4 inch (6.4 mm) diameter wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.

**R404.1.8 Rubble stone masonry.** Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m), and shall not be constructed in Seismic Design Categories D0, D1, D2 or townhouses in Seismic Design Category C, as established in Figure R301.2(2).

**R404.1.9.4 Seismic design of masonry piers.** Masonry piers in all *dwelling*s located in Seismic Design Category D0, D1 or D2, and townhouses in Seismic Design Category C, shall be designed in accordance with accepted engineering practice.

**R404.5.2 Precast concrete foundation design drawings.** Precast concrete foundation wall design drawings shall be submitted to the *building official* and *approved* prior to installation. Drawings shall include, at a minimum, the information specified below:

1. Design loading as applicable;
2. Footing design and material;
3. Concentrated loads and their points of application;
4. Soil bearing capacity;
5. Maximum allowable total uniform load;
6. Seismic design category; and
7. Basic wind speed.

**R407.3 Structural requirements.** The columns shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall not be less in nominal size than 4 inches by 4 inches (102 mm by 102 mm). Steel columns shall not be less than 3-inch-diameter (76 mm) Schedule 40 pipe manufactured in accordance with ASTM A 53 Grade B or *approved* equivalent.

**Exception:** In Seismic Design Categories A, B and C, columns Columns no more than 48 inches (1219 mm) in height on a pier or footing are exempt from the bottom end lateral displacement requirement within under-floor areas enclosed by a continuous foundation.

**R502.7 Lateral restraint at supports.** Joists shall be supported laterally at the ends by full-depth solid blocking not less than 2 inches (51 mm) nominal in thickness; or by attachment to a full-depth header, band or rim joist, or to an adjoining stud or shall be otherwise provided with lateral support to prevent rotation.

**Exceptions:**

1. Trusses, structural composite lumber, structural glued-laminated members and I-joists shall be supported laterally as required by the manufacturer's recommendations.
2. In Seismic Design Categories D0, D1 and D2, lateral restraint shall also be provided at each intermediate support.

**TABLE R502.3.1(1)**

a. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D0, D1 and D2 shall be determined in accordance with Section R301.2.2.2.1.

**TABLE R502.3.1(2)**

b. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D0, D1, and D2 shall be determined in accordance with Section R301.2.2.2.1.

**TABLE R502.3.3(1)**

f. See Section R301.2.2.2.5, Item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Category D0, D1, or D2 and townhouses in Seismic Design Category C, D0, D1, or D2.

**TABLE R602.3.1**

**MAXIMUM ALLOWABLE LENGTH OF WOOD WALL STUDS EXPOSED TO WIND SPEEDS OF 100 mph OR LESS IN SEISMIC DESIGN CATEGORIES A, B, C, D0, D1 and D2<sup>b, c</sup>**

Revise the following table as shown:

**TABLE R602.10.1.3  
BRACED WALL LINE SPACING**

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind bracing	85 mph to < 110 mph	Detached, townhouse	60 feet	None
Seismic bracing	<del>SDC A - C</del>	<del>Detached</del>	<del>Use wind bracing</del>	
	<del>SDC A - B</del>	<del>Townhouse</del>	<del>Use wind bracing</del>	
	<del>SDC C</del>	<del>Townhouse</del>	<del>35 feet</del>	<del>Up to 50 feet when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4).</del>
	<del>SDC D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub></del>	<del>Detached, townhouses, one- and two-story only</del>	<del>25 feet</del>	<del>Up to 35 feet to allow for a single room not to exceed 900 square feet. Spacing of all other braced wall lines shall not exceed 25 feet.</del>
	<del>SDC D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub></del>	<del>Detached, townhouse</del>	<del>25 feet</del>	<del>Up to 35 feet when length of required bracing per Table R602.10.3(3) is adjusted in accordance with Table R602.10.3(4).</del>

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>, 1 mile per hour = 0.447 m/s.

**R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D0, D1 and D2.** *Braced wall panels shall be located at each end of a braced wall line.*

**Exception:** *Braced wall panels* constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a *braced wall line* provided each end complies with one of the following:

1. A minimum 24-inch wide (610 mm) panel for Methods WSP, BV-WSP, CS-WSP, CS-G, and CS-PF, and 32-inch wide (813 mm) panel for Method CS-SFB is applied to each side of the building corner as shown in Condition 4 of Figure R602.10.7.
2. The end of each *braced wall panel* closest to the end of the *braced wall line* shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of the *braced wall panel* closest to the corner and to the foundation or framing below as shown in Condition 5 of Figure R602.10.7.

3. For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each *braced wall panel*.

**R602.10.3 Required length of bracing.** The required length of bracing along each *braced wall line* shall be determined as follows.







1. All buildings in Seismic Design Categories A and B shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
2. Detached buildings in Seismic Design Category C shall use Table R602.10.3(1) and the applicable adjustment factors in Table R602.10.3(2).
3. Townhouses in Seismic Design Category C shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.
4. All buildings in Seismic Design Categories D0, D1 and D2 shall use the greater value determined from Table R602.10.3(1) or R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4) respectively.

Only *braced wall panels* parallel to the *braced wall line* shall contribute toward the required length of bracing of that *braced wall line*. *Braced wall panels* along an angled wall meeting the minimum length requirements of Tables R602.10.5 and R602.10.5.2 shall be permitted to contribute its projected length toward the minimum required length of bracing for the *braced wall line* as shown in Figure R602.10.1.4. Any *braced wall panel* on an angled wall at the end of a *braced wall line* shall contribute its projected length for only one of the *braced wall lines* at the projected corner.

**Exception:** The length of wall bracing for dwellings in Seismic Design Categories D0, D1 and D2 with stone or masonry veneer installed per Section R703.7 and exceeding the first-story height shall be in accordance with Section R602.10.6.5.

Delete the following table:







TABLE R602.10.3(3)  
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

SOIL CLASS D <sup>5</sup> WALL HEIGHT = 10 FEET 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING ≤ 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE <sup>6</sup>				
Seismic Design Category	Story Location	Braced Wall Line Length (feet)	Method LFB <sup>2</sup>	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB <sup>6</sup>	Method WSP	Methods CS-WSP, CS-G
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D <sub>0</sub>		10	NP	2.8	2.8	1.8	1.6
		20	NP	5.5	5.5	3.6	3.1
		30	NP	8.3	8.3	5.4	4.6
		40	NP	11.0	11.0	7.2	6.1
		50	NP	13.8	13.8	9.0	7.7
		10	NP	5.3	5.3	3.8	3.2
		20	NP	10.5	10.5	7.5	6.4
		30	NP	15.8	15.8	11.3	9.6
		40	NP	21.0	21.0	15.0	12.8
		50	NP	26.3	26.3	18.8	16.0
		10	NP	7.3	7.3	5.3	4.5
		20	NP	14.5	14.5	10.5	9.0
		30	NP	21.8	21.8	15.8	13.4
		40	NP	29.0	29.0	21.0	17.9
		50	NP	36.3	36.3	26.3	22.3

(continued)

Delete the following table:

TABLE R602.10.3(3)—continued  
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

<ul style="list-style-type: none"> <li>• SOIL CLASS D<sup>b</sup></li> <li>• WALL HEIGHT = 10 FEET</li> <li>• 10 PSF FLOOR DEAD LOAD</li> <li>• 15 PSF ROOF/CEILING DEAD LOAD</li> <li>• BRACED WALL LINE SPACING ≤ 25 FEET</li> </ul>			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE <sup>c</sup>				
Seismic Design Category	Story Location	Braced Wall Line Length (feet)	Method LFB <sup>c</sup>	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB <sup>d</sup>	Method WSP	Methods CS-WSP, CS-G
D <sub>1</sub>		10	NP	3.0	3.0	2.0	1.7
		20	NP	6.0	6.0	4.0	3.4
		30	NP	9.0	9.0	6.0	5.1
		40	NP	12.0	12.0	8.0	6.8
		50	NP	15.0	15.0	10.0	8.5
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
		10	NP	8.5	8.5	6.0	5.1
		20	NP	17.0	17.0	12.0	10.2
		30	NP	25.5	25.5	18.0	15.3
		40	NP	34.0	34.0	24.0	20.4
		50	NP	42.5	42.5	30.0	25.5
D <sub>2</sub>		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

For SE: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.




b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the  $S_{ds}$  values associated with the Seismic Design Categories shall be permitted when a site specific  $S_{ds}$  value is determined in accordance with Section 1613.3 of the *International Building Code*.

c. Method LFB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.

d. Method CS-SFB applies in SDC C only.

Delete the following table:

**TABLE R602.10.3(4)**  
**SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING**

ADJUSTMENT BASED ON:	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR <sup>a, b</sup> (Multiply length from Table R602.10.3(1) by this factor)	APPLICABLE METHODS
Story height (Section 301.3)	Any story	≤ 10 feet > 10 feet and ≤ 12 feet	1.0 1.2	All methods
Braced wall line spacing, townhouses in SDC C	Any story	≤ 35 feet > 35 feet and ≤ 50 feet	1.0 1.43	
Braced wall line spacing, in SDC D <sub>0</sub> , D <sub>1</sub> , D <sub>2</sub> <sup>c</sup>	Any story	> 25 feet and ≤ 30 feet > 30 feet and ≤ 35 feet	1.2 1.4	
Wall dead load	Any story	> 8 psf and < 15 psf < 8 psf	1.0 0.85	
Roof/ceiling dead load for wall supporting	Roof only or roof plus one or two stories	≤ 15 psf	1.0	
	Roof plus one or two stories	> 15 psf and ≤ 25 psf	1.1	
	Roof only	> 15 psf and ≤ 25 psf	1.2	
Walls with stone or masonry veneer, town- houses in SDC <sup>d, e</sup>		1.0		All intermittent and continuous methods
		1.5		
		1.5		
Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D <sub>0</sub> – D <sub>2</sub> <sup>d</sup>	Any story	See Table R602.10.6.5		BV-WSP
Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation shall be permitted.

b. The total length of bracing required for a given wall line is the product of all applicable adjustment factors.

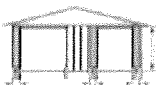
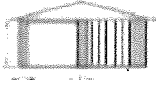
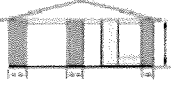


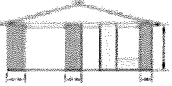
c. The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be a minimum of 12 16d nails on each side of the splice.

d. Applies to stone or masonry veneer exceeding the first story height. See Section R602.10.6.5 for requirements when stone or masonry veneer does not exceed the first story height.

e. The adjustment factor for stone or masonry veneer shall be applied to all exterior *braced wall lines* and all *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supported veneered walls.

Revise the following table:

TABLE R602.10.4—continued  
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA*	
				Fasteners	Spacing
Intermittent Bracing Methods	<b>PFH</b> Portal frame with hold-downs	$\frac{1}{4}$ "		See Section R602.10.6.2	See Section R602.10.6.2
	<b>PFG</b> Portal frame at garage	$\frac{1}{16}$ "		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	<b>CS-WSP</b> Continuously sheathed wood structural panel	$\frac{1}{8}$ "		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
	<b>CS-G</b> Continuously sheathed wood structural panel adjacent to garage openings	$\frac{1}{8}$ "		See Method CS-WSP	See Method CS-WSP
	<b>CS-PF</b> Continuously sheathed portal frame	$\frac{1}{16}$ "		See Section R602.10.6.4	See Section R602.10.6.4
	<b>CS-SFB</b> Continuously sheathed structural fiberboard	$\frac{1}{2}$ " or $\frac{5}{16}$ " for maximum 16" stud spacing		$1\frac{1}{2}$ " long $\times$ 0.12" dia. (for $\frac{1}{2}$ " thick sheathing) $1\frac{3}{4}$ " long $\times$ 0.12" dia. (for $\frac{5}{16}$ " thick sheathing) galvanized roofing nails or 8d common ( $2\frac{1}{2}$ " long $\times$ 0.131" dia.) nails	3" edges 6" field

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m<sup>2</sup>, 1 mile per hour = 0.447 m/s.

a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D<sub>s</sub>, D<sub>1</sub> and D<sub>2</sub>.

b. Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D<sub>1</sub>, D<sub>2</sub> and D<sub>3</sub> roof covering dead load may not exceed 3 psf.

c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full height clear opening shall not be permitted adjacent to a Method CS-G panel.

d. Method CS-SFB does not apply in Seismic Design Categories D<sub>s</sub>, D<sub>1</sub> and D<sub>2</sub> and in areas where the wind speed exceeds 100 mph.

e. Method CS-SFB applies to detached one- and two-family dwellings in Seismic Design Categories D<sub>3</sub> through D<sub>5</sub> only.

#### R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from *braced wall line* to *braced wall line* within a story shall be permitted. ~~Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 100 mph (45 m/s), mixing~~ Mixing of intermittent bracing and continuous sheathing methods from *braced wall line* to *braced wall line* within a story shall be permitted.
3. Mixing intermittent bracing methods along a *braced wall line* shall be permitted ~~in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C~~ provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CSWSP, CS-G and CS-PF along a *braced wall line* shall be permitted.
5. ~~In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing~~ Mixing of intermittent bracing methods along the interior portion of a *braced wall line* with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same *braced wall line* shall be



permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the *braced wall line*.

**R602.10.4.3 Braced wall panel interior finish material.** *Braced wall panels* shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than ½ inch (12.7 mm) in thickness and be fastened with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum wall board. Spacing of fasteners at panel edges for gypsum wall board opposite Method LIB bracing shall not exceed 8 inches (203 mm). ~~Interior finish material shall not be glued in Seismic Design Categories D0, D1 and D2.~~

**Exceptions:**

1. Interior finish material is not required opposite wall panels that are braced in accordance with Methods GB, BV-WSP, ABW, PFH, PFG and CS-PF, unless otherwise required by Section R302.6.
2. An approved interior finish material with an in-plane shear resistance equivalent to gypsum board shall be permitted to be substituted, unless otherwise required by Section R302.6.
3. Except for Method LIB, gypsum wall board is permitted to be omitted provided the required length of bracing in Tables R602.10.3(1) and R602.10.3(3) is multiplied by the appropriate adjustment factor in Tables R602.10.3(2) and R602.10.3(4) respectively, unless otherwise required by Section R302.6.

**R602.10.5.2 Partial credit.** For Methods DWB, WSP, SFB, PBS, PCP and HPS ~~in Seismic Design Categories A, B and C~~, panels between 36 inches and 48 inches (914 mm and 1219 mm)) in length shall be considered a *braced wall panel* and shall be permitted to partially contribute toward the required length of bracing in Tables R602.10.3(1) and R602.10.3(3), and the contributing length shall be determined from Table R602.10.5.2.

Revise the following table:

TABLE R602.10.5  
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		MINIMUM LENGTH <sup>a</sup> (Inches)					CONTRIBUTING LENGTH (Inches)
		Wall Height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
DWB, WSP, SFB, PBS, PCP, IPS, BV-WSP		48	48	48	53	58	Actual <sup>b</sup>
GB		48	48	48	53	58	Double sided = Actual Single sided = 0.5 × Actual
LFB		55	62	69	NP	NP	Actual <sup>b</sup>
ABW	<del>SDC A, B and C,</del> wind speed < 110 mph	28	32	34	38	42	48
	<del>SDC D<sub>1</sub>, D<sub>2</sub> and D<sub>3</sub>,</del> wind speed < 110 mph	<del>32</del>	<del>32</del>	<del>34</del>	<del>NP</del>	<del>NP</del>	
PFH	Supporting roof only	16	16	16	18 <sup>c</sup>	20 <sup>c</sup>	48
	Supporting one story and roof	24	24	24	27 <sup>c</sup>	29 <sup>c</sup>	48
PFG		24	27	30	33 <sup>d</sup>	36 <sup>d</sup>	1.5 × Actual <sup>b</sup>
CS-G		24	27	30	33	36	Actual <sup>b</sup>
CS-PF		16	18	20	22 <sup>e</sup>	24 <sup>e</sup>	Actual <sup>b</sup>
CS-WSP, CS-SFB	Adjacent clear opening height (Inches)						Actual <sup>b</sup>
	≤ 64	24	27	30	33	36	
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100	—	44	40	38	38	
	104	—	49	43	40	39	
	108	—	54	46	43	41	
	112	—	—	50	45	43	
	116	—	—	55	48	45	
	120	—	—	60	52	48	
	124	—	—	—	56	51	
	128	—	—	—	61	54	
	132	—	—	—	66	58	
	136	—	—	—	—	62	
	140	—	—	—	—	66	
	144	—	—	—	—	72	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

NP = Not Permitted.

a. Linear interpolation shall be permitted.

b. Use the actual length when it is greater than or equal to the minimum length.

c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height may be increased to 12 feet with pony wall.

d. Maximum opening height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height may be increased to 12 feet with pony wall.

e. Maximum opening height for CS-PF is 10 feet in accordance with Figure R602.10.6.4, but wall height may be increased to 12 feet with pony wall.

Revise the following table:

TABLE R602.10.6.1  
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

<del>SEISMIC DESIGN CATEGORY AND</del> WIND SPEED	SUPPORTING/STORY	HOLD-DOWN FORCE (pounds)				
		Height of Braced Wall Panel				
		8 feet	9 feet	10 feet	11 feet	12 feet
<del>SEISMIC DESIGN CATEGORY A, B, and C</del> Wind speed < 110 mph	One story	1,800	1,800	1,800	2,000	2,200
	First of two stories	3,000	3,000	3,000	3,300	3,600
<del>SEISMIC DESIGN CATEGORY D0, D1, and D2</del> Wind speed ≥ 110 mph	<del>One story</del>	<del>1,800</del>	<del>1,800</del>	<del>1,800</del>	<del>NP</del>	<del>NP</del>
	<del>First of two stories</del>	<del>3,000</del>	<del>3,000</del>	<del>3,000</del>	<del>NP</del>	<del>NP</del>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.45 N, 1 mile per hour = 0.447 m/s.

NP = Not Permitted

**R602.10.6.3 Method PFG: Portal frame at garage door openings in Seismic Design Categories A, B and C.** Where supporting a roof or one story and a roof, a Method PFG *braced wall panel* constructed in accordance with Figure R602.10.6.3 shall be permitted on either side of garage door openings.

**R602.10.6.4 Method CS-PF: Continuously sheathed portal frame.** Continuously sheathed portal frame *braced wall panels* shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4. The number of continuously sheathed portal frame panels in a single *braced wall line* shall not exceed four.

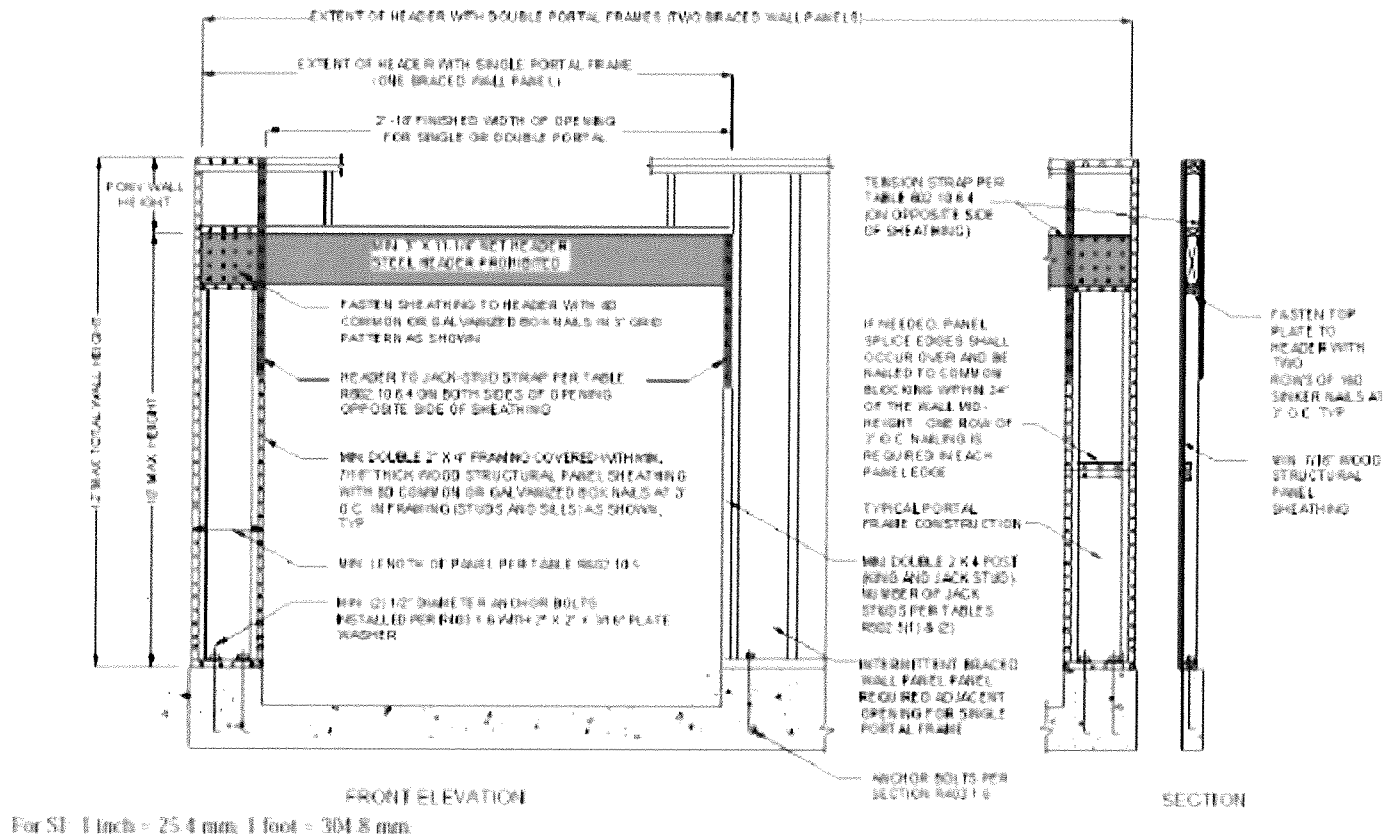
**R602.10.6.5 Wall bracing for dwellings with stone and masonry veneer in Seismic Design Categories D0, D1 and D2.** Where stone and masonry veneer are installed in accordance with Section R703.7, wall bracing on exterior *braced wall lines* and *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supporting veneered walls shall comply with this section.

Where dwellings in Seismic Design Categories D0, D1 and D2 have stone or masonry veneer installed in accordance with Section R703.7, and the veneer does not exceed the first story height, wall bracing shall be in accordance with Section R602.10.3.

Where detached one- or two-family dwellings in Seismic Design Categories D0, D1 and D2 have stone or masonry veneer installed in accordance with Section R703.7, and the veneer exceeds the first story height, wall bracing at exterior *braced wall lines* and *braced wall lines* on the interior of the building shall be constructed using Method BV-WSP in accordance with this section and Figure R602.10.6.5. Cripple walls shall not be permitted, and required interior *braced wall lines* shall be supported on continuous foundations. Townhouses in Seismic Design Categories D0, D1 and D2 with stone or masonry veneer exceeding the first story height shall be designed in accordance with accepted engineering practice.

**R602.10.6.5.1 Length of bracing.** The length of bracing along each *braced wall line* shall be the greater of that required by the design wind speed and *braced wall line* spacing in accordance with Table R602.10.3(1) as adjusted by the factors in the Table R602.10.3(2) or the Seismic Design Category and *braced wall line* length in accordance with Table R602.10.6.5. Angled walls shall be permitted to be counted in accordance with Section R602.10.1.4, and *braced wall panel* location shall be in accordance with Section R602.10.2.2. The seismic adjustment factors in Table R602.10.3(4) shall not be applied to the length of bracing determined using Table R602.10.6.5. In no case shall the minimum total length of bracing in a *braced wall line*, after all adjustments have been taken, be less than 48 inches (1219 mm) total.











Revise the following figure:



**FIGURE R602.10.6.3**  
**METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C**

Delete the following table:

TABLE R602.10.6.5  
METHOD BV-WSP WALL BRACING REQUIREMENTS

METHOD OF WSP WALL BRACING REQUIREMENTS								
SEISMIC DESIGN CATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)					SINGLE-STORY HOLD-DOWN FORCE (pounds) <sup>a</sup>	CUMULATIVE HOLD-DOWN FORCE (pounds) <sup>b</sup>
		10	20	30	40	50		
		MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE						
D <sub>0</sub>		4.0	7.0	10.5	14.0	17.5	N/A	...
		4.0	7.0	10.5	14.0	17.5	1900	...
		4.5	9.0	13.5	18.0	22.5	3500	5400
		6.0	12.0	18.0	24.0	30.0	3500	8900
D <sub>1</sub>		4.5	9.0	13.5	18.0	22.5	2100	...
		4.5	9.0	13.5	18.0	22.5	3700	5800
		6.0	12.0	18.0	24.0	30.0	3700	9500
D <sub>2</sub>		5.5	11.0	16.5	22.0	27.5	2300	...
		5.5	11.0	16.5	22.0	27.5	3900	6200
		NP	NP	NP	NP	NP	N/A	N/A

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa; 1 pound force = 4.448 N.

NP = Not Permitted.

N/A = Not Applicable.

- Hold down force is minimum allowable stress design load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained.
- Where hold down connectors from stories above align with stories below, use cumulative hold down force to size middle and bottom story hold down connectors.

Delete the following figure:

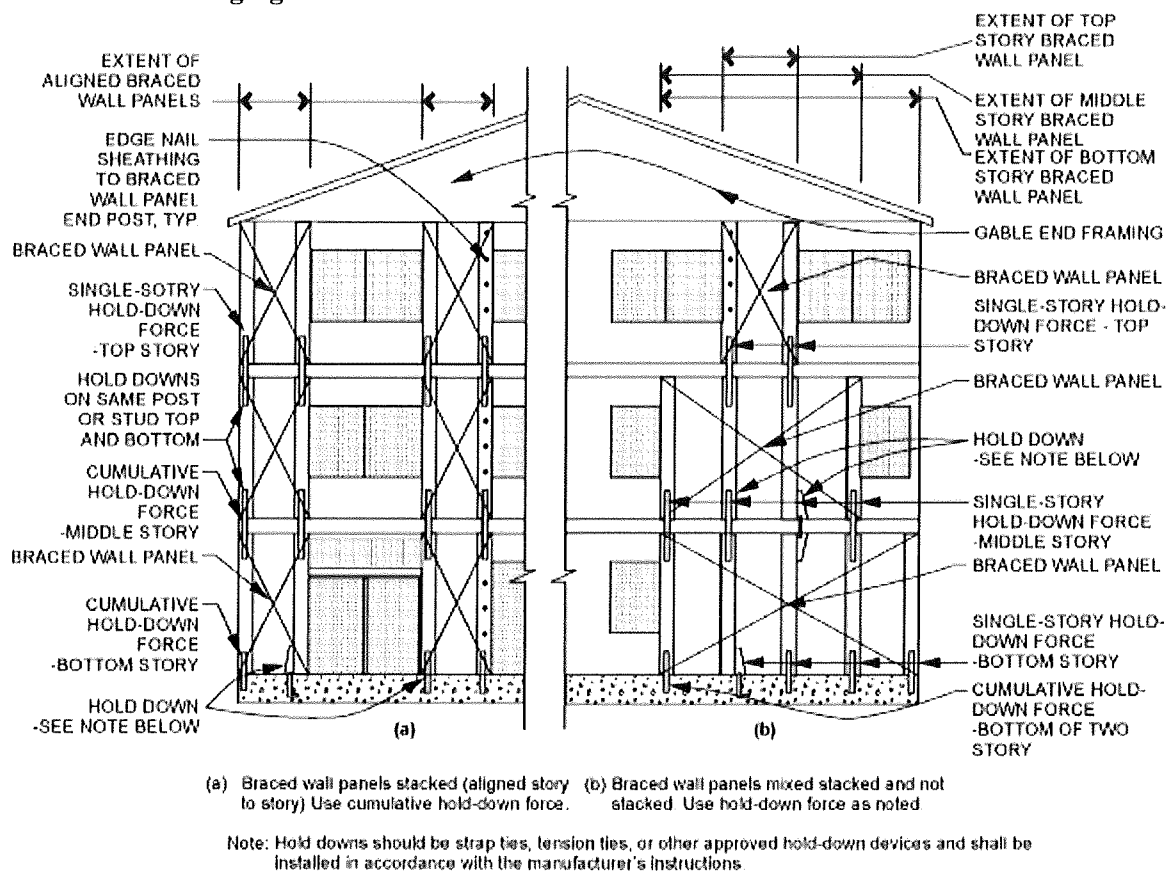


FIGURE R602.10.6.5  
METHOD BV-WSP—WALL BRACING FOR DWELLINGS WITH STONE AND  
MASONRY VENEER IN SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>

**R602.10.8.1 Braced wall panel connections for Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.** *Braced wall panels* shall be fastened to required foundations in accordance with Section R602.11.1, and top plate lap splices shall be face-nailed with at least eight 16d nails on each side of the splice.

**R602.10.8.2 Connections to roof framing.** Top plates of exterior *braced wall panels* shall be attached to rafters or roof trusses above in accordance with Table R602.3(1) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of *braced wall panels* and to rafters and roof trusses in accordance with Table R602.3(1). A continuous band, rim, or header joist or roof truss parallel to the *braced wall panels* shall be permitted to replace the blocking required by this section.

Blocking shall not be required over openings in continuously-sheathed *braced wall lines*. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with Section R806.1.

1. For Seismic Design Categories A, B and C and wind speeds less than 100 mph (45 m/s) where Where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above is 91/4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses above is between 91/4 inches (235 mm) and 151/4 inches (387 mm), blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.8.2(1).
2. For Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> or wind speeds of 100 mph (45 m/s) or greater, where the distance from the top of the *braced wall panel* to the top of the rafters or roof trusses is 151/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the *braced wall panel* in accordance with Figure R602.10.8.2(1).

3. Where the distance from the top of the *braced wall panel* to the top of rafters or roof trusses exceeds 15 1/4 inches (387 mm), the top plates of the *braced wall panel* shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods:

- 3.1. Soffit blocking panels constructed in accordance with Figure R602.10.8.2(2);
- 3.2. Vertical blocking panels constructed in accordance with Figure R602.10.8.2(3);
- 3.3. Full-height engineered blocking panels designed in accordance with the AF&PA WFCM; or
- 3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with accepted engineering practice.

**R602.10.9.1 Braced wall panel support for Seismic Design Category D2.** In one-story buildings located in Seismic Design Category D2, *braced wall panels* shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two-story buildings located in Seismic Design Category D2, all *braced wall panels* shall be supported on continuous foundations.

**Exception:** Two-story buildings shall be permitted to have interior *braced wall panels* supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
2. First floor *braced wall panels* are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the *braced wall line*.

**R602.10.11.1 Cripple wall bracing for Seismic Design Categories D0 and D1 and townhouses in Seismic Design Category C.** In addition to the requirements in Section R602.10.11, the distance between adjacent edges of *braced wall panels* for cripple walls along a *braced wall line* shall be 14 feet (4267 mm) maximum.

Where *braced wall lines* at interior walls are not supported on a continuous foundation below, the adjacent parallel cripple walls, where provided, shall be braced with Method WSP or Method CS-WSP in accordance with Section R602.10.4. The length of bracing required in accordance with Table R602.10.3(3) for the cripple walls shall be multiplied by 1.5. Where the cripple walls do not have sufficient length to provide the required bracing, the spacing of panel edge fasteners shall be reduced to 4 inches (102 mm) on center and the required bracing length adjusted by 0.7. If the required length can still not be provided, the cripple wall shall be designed in accordance with accepted engineering practice.

**R602.10.11.2 Cripple wall bracing for Seismic Design Category D2.** In Seismic Design Category D2, cripple walls shall be braced in accordance with Tables R602.10.3(3) and R602.10.3(4).

**R602.10.11.3 Redesignation of cripple walls.** Where all cripple wall segments along a *braced wall line* do not exceed 48 inches (1219 mm) in height, the cripple walls shall be permitted to be redesignated as a first *story* wall for purposes of determining wall bracing requirements. Where any cripple wall segment in a *braced wall line* exceeds 48 inches (1219 mm) in height, the entire cripple wall shall be counted as an additional *story*. If the cripple walls are redesignated, the stories above the redesignated *story* shall be counted as the second and third stories, respectively.

**R602.11 Wall anchorage.** *Braced wall line* sills shall be anchored to concrete or masonry foundations in accordance with Sections R403.1.6 and R602.11.1.

**R602.11.1 Wall anchorage for all buildings in Seismic Design Categories D0, D1 and D2 and townhouses in Seismic Design Category C.** Plate washers, a minimum of 0.229 inch by 3 inches by 3 inches (5.8 mm by 76 mm by 76 mm) in size, shall be provided between the foundation sill plate and the nut except where *approved* anchor straps are used. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16 inch (5 mm) larger than the bolt diameter and a slot length not to exceed 1 3/4 inches (44 mm), provided a standard cut washer is placed between the plate washer and the nut.

**R602.11.2 Stepped foundations in Seismic Design Categories D0, D1 and D2.** In all buildings located in Seismic Design Categories D0, D1 or D2, where the height of a required *braced wall line* that extends from foundation to floor above varies more than 4 feet (1219 mm), the *braced wall line* shall be constructed in accordance with the following:

1. Where the lowest floor framing rests directly on a sill bolted to a foundation not less than 8 feet (2440 mm) in length along a line of bracing, the line shall be considered as braced. The double plate of the cripple stud wall beyond the segment of footing that extends to the lowest framed floor shall be spliced by extending the upper top plate a minimum

of 4 feet (1219 mm) along the foundation. Anchor bolts shall be located a maximum of 1 foot and 3 feet (305 and 914 mm) from the step in the foundation. See Figure R602.11.2.

2. Where cripple walls occur between the top of the foundation and the lowest floor framing, the bracing requirements of Sections R602.10.11, R602.10.11.1 and R602.10.11.2 shall apply.

3. Where only the bottom of the foundation is stepped and the lowest floor framing rests directly on a sill bolted to the foundations, the requirements of Sections R403.1.6 and R602.11.1 shall apply.

**R602.12 Simplified wall bracing.** Buildings meeting all of the conditions listed in items 1-8 shall be permitted to be braced in accordance with this section as an alternative to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.

2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.

3. Wall height shall not be greater than 10 feet (2743 mm).

4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.

5. All exterior walls shall have gypsum board with a minimum thickness of 1/2 inch (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.

6. The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A or B.

7. ~~The structure shall be located in Seismic Design Category A, B or C for detached one and two family dwellings or Seismic Design Category A or B for townhouses.~~

8. Cripple walls shall not be permitted in two-story buildings.

**R603.9.4.1 Wind speeds greater than 100 mph.** Where wind speeds are in excess of 100 miles per hour (45 m/s), Exposure C, walls shall be provided wind direct uplift connections in accordance with AISI S230, Section E13.3, and AISI S230, Section F7.2, as required for 110 miles per hour (49 m/s), Exposure C.

**R603.9.5 Structural sheathing for stone and masonry veneer.** ~~In Seismic Design Category C, where stone and masonry veneer is installed in accordance with Section R703.7, the length of structural sheathing for walls supporting one story, roof and ceiling shall be the greater of the amount required by Section R603.9.2 or 36 percent, modified by Section R603.9.2 except Section R603.9.2.2 shall not be permitted.~~

**R606.2.4 Parapet walls.** Unreinforced *solid masonry* parapet walls shall not be less than 8 inches (203 mm) thick and their height shall not exceed four times their thickness. Unreinforced hollow unit masonry parapet walls shall be not less than 8 inches (203 mm) thick, and their height shall not exceed three times their thickness. ~~Masonry parapet walls in areas subject to wind loads of 30 pounds per square foot (1.44 kPa) located in Seismic Design Category D0, D1 or D2, or on townhouses in Seismic Design Category C shall be reinforced in accordance with Section R606.12.~~

**R606.9.2 Vertical lateral support.** Vertical lateral support of masonry walls in ~~Seismic Design Category A, B or C~~ shall be provided in accordance with one of the methods in Section R606.9.2.1 or Section R606.9.2.2.

**R606.9.2.1 Roof structures.** Masonry walls shall be anchored to roof structures with metal strap anchors spaced in accordance with the manufacturer's instructions, 1/2-inch (13 mm) bolts spaced not more than 6 feet (1829 mm) on center, or other *approved* anchors.

Anchors shall be embedded at least 16 inches (406 mm) into the masonry, or be hooked or welded to bond beam reinforcement placed not less than 6 inches (152 mm) from the top of the wall.

**R606.12 Seismic requirements.** ~~The seismic requirements of this section shall apply to the design of masonry and the construction of masonry building elements located in Seismic Design Category D0, D1 or D2. Townhouses in Seismic Design Category C shall comply with the requirements of Section R606.12.2. These requirements shall not apply to glass unit masonry conforming to Section R610 or masonry veneer conforming to Section R703.7.~~

**R606.12.1 General.** Masonry structures and masonry elements shall comply with the requirements of Sections R606.12.2 through R606.12.4 ~~based on the seismic design category established in Table R301.2(1).~~ Masonry structures and masonry



elements shall comply with the requirements of Section R606.12 and Figures R606.11(1), R606.11(2) and R606.11(3) or shall be designed in accordance with TMS 402/ACI 530/ASCE 5 or TMS 403.

**R606.12.1.1 Floor and roof diaphragm construction.** Floor and roof *diaphragms* shall be constructed of wood structural panels attached to wood framing in accordance with Table R602.3(1) or to cold-formed steel floor framing in accordance with Table R505.3.1(2) or to cold-formed steel roof framing in accordance with Table R804.3. Additionally, sheathing panel edges perpendicular to framing members shall be backed by blocking, and sheathing shall be connected to the blocking with fasteners at the edge spacing. For Seismic Design Categories C, D0, D1 and D2, where the width-to-thickness dimension of the *diaphragm* exceeds 2 to 1, edge spacing of fasteners shall be 4 inches (102 mm) on center.

**R606.12.2 Seismic Design Category C.** Townhouses located in Seismic Design Category C shall comply with the requirements of this section.

**R606.12.2.1 Minimum length of wall without openings.** Table R606.12.2.1 shall be used to determine the minimum required solid wall length without openings at each masonry exterior wall. The provided percentage of solid wall length shall include only those wall segments that are 3 feet (914 mm) or longer. The maximum clear distance between wall segments included in determining the solid wall length shall not exceed 18 feet (5486 mm). Shear wall segments required to meet the minimum wall length shall be in accordance with Section R606.12.2.2.3.

**R606.12.2.2 Design of elements not part of the lateral force-resisting system.**

**R606.12.2.2.1 Load-bearing frames or columns.** Elements not part of the lateral force-resisting system shall be analyzed to determine their effect on the response of the system. The frames or columns shall be adequate for vertical load carrying capacity and induced moment caused by the design *story* drift.

**R606.12.2.2.2 Masonry partition walls.** Masonry partition walls, masonry screen walls and other masonry elements that are not designed to resist vertical or lateral loads, other than those induced by their own weight, shall be isolated from the structure so that vertical and lateral forces are not imparted to these elements. Isolation joints and connectors between these elements and the structure shall be designed to accommodate the design *story* drift.

**R606.12.2.2.3 Reinforcement requirements for masonry elements.** Masonry elements listed in Section R606.12.2.2.2 shall be reinforced in either the horizontal or vertical direction as shown in Figure R606.11(2) and in accordance with the following:

1. Horizontal reinforcement. Horizontal joint reinforcement shall consist of at least two longitudinal W1.7 wires spaced not more than 16 inches (406 mm) for walls greater than 4 inches (102 mm) in width and at least one longitudinal W1.7 wire spaced not more than 16 inches (406 mm) for walls not exceeding 4 inches (102 mm) in width; or at least one No. 4 bar spaced not more than 48 inches (1219 mm). Where two longitudinal wires of joint reinforcement are used, the space between these wires shall be the widest that the mortar joint will accommodate. Horizontal reinforcement shall be provided within 16 inches (406 mm) of the top and bottom of these masonry elements.
2. Vertical reinforcement. Vertical reinforcement shall consist of at least one No. 4 bar spaced not more than 48 inches (1219 mm). Vertical reinforcement shall be located within 16 inches (406 mm) of the ends of masonry walls.

**R606.12.2.3 Design of elements part of the lateral force-resisting system.**

**R606.12.2.3.1 Connections to masonry shear walls.** Connectors shall be provided to transfer forces between masonry walls and horizontal elements in accordance with the requirements of Section 1.7.4 of TMS 402/ACI 530/ASCE 5. Connectors shall be designed to transfer horizontal design forces acting either perpendicular or parallel to the wall, but not less than 200 pounds per linear foot (2919 N/m) of wall. The maximum spacing between connectors shall be 4 feet (1219 mm). Such anchorage mechanisms shall not induce tension stresses perpendicular to grain in ledgers or nailers.

**R606.12.2.3.2 Connections to masonry columns.** Connectors shall be provided to transfer forces between masonry columns and horizontal elements in accordance with the requirements of Section 1.7.4 of TMS 402/ACI 530/ASCE 5. Where anchor bolts are used to connect horizontal elements to the tops of columns, the bolts shall be placed within lateral ties. Lateral ties shall enclose both the vertical bars in the column and the anchor bolts. There shall be a minimum of two No. 4 lateral ties provided in the top 5 inches (127 mm) of the column.

**R606.12.2.3.3 Minimum reinforcement requirements for masonry shear walls.** Vertical reinforcement of at least one No. 4 bar shall be provided at corners, within 16 inches (406 mm) of each side of openings, within 8 inches (203 mm) of each side of movement joints, within 8 inches (203 mm) of the ends of walls, and at a maximum spacing of 10 feet (3048 mm).

Horizontal joint reinforcement shall consist of at least two wires of W1.7 spaced not more than 16 inches (406 mm); or bond beam reinforcement of at least one No. 4 bar spaced not more than 10 feet (3048 mm) shall be provided. Horizontal reinforcement

shall also be provided at the bottom and top of wall openings and shall extend not less than 24 inches (610 mm) nor less than 40 bar diameters past the opening; continuously at structurally connected roof and floor levels; and within 16 inches (406 mm) of the top of walls.

**R606.12.3 Seismic Design Category D0 or D1.** Structures in Seismic Design Category D0 or D1 shall comply with the requirements of Seismic Design Category C and the additional requirements of this section.

**R606.12.3.1 Design requirements.** Masonry elements other than those covered by Section R606.12.2.2.2 shall be designed in accordance with the requirements of Chapter 1 and Sections 2.1 and 2.3 of TMS 402, ACI 530/ASCE 5 and shall meet the minimum reinforcement requirements contained in Sections R606.12.3.2 and R606.12.3.2.1. Otherwise, masonry shall be designed in accordance with TMS 403.

**Exception:** Masonry walls limited to one story in height and 9 feet (2743 mm) between lateral supports need not be designed provided they comply with the minimum reinforcement requirements of Sections R606.12.3.2 and R606.12.3.2.1.

**R606.12.3.2 Minimum reinforcement requirements for masonry walls.** Masonry walls other than those covered by Section R606.12.2.2.3 shall be reinforced in both the vertical and horizontal direction. The sum of the cross-sectional area of horizontal and vertical reinforcement shall be at least 0.002 times the gross cross-sectional area of the wall, and the minimum cross-sectional area in each direction shall be not less than 0.0007 times the gross cross-sectional area of the wall. Reinforcement shall be uniformly distributed. Table R606.12.3.2 shows the minimum reinforcing bar sizes required for varying thicknesses of masonry walls. The maximum spacing of reinforcement shall be 48 inches (1219 mm) provided that the walls are solid grouted and constructed of hollow open-end units, hollow units laid with full head joints or two wythes of solid units. The maximum spacing of reinforcement shall be 24 inches (610 mm) for all other masonry.

**R606.12.3.2.1 Shear wall reinforcement requirements.** The maximum spacing of vertical and horizontal reinforcement shall be the smaller of one-third the length of the shear wall, one-third the height of the shear wall, or 48 inches (1219 mm). The minimum cross-sectional area of vertical reinforcement shall be one-third of the required shear reinforcement. Shear reinforcement shall be anchored around vertical reinforcing bars with a standard hook.

**R606.12.3.3 Minimum reinforcement for masonry columns.** Lateral ties in masonry columns shall be spaced not more than 8 inches (203 mm) on center and shall be at least 3/8-inch (9.5 mm) diameter. Lateral ties shall be embedded in grout.

**R606.12.3.4 Material restrictions.** Type N mortar or masonry cement shall not be used as part of the lateral force-resisting system.

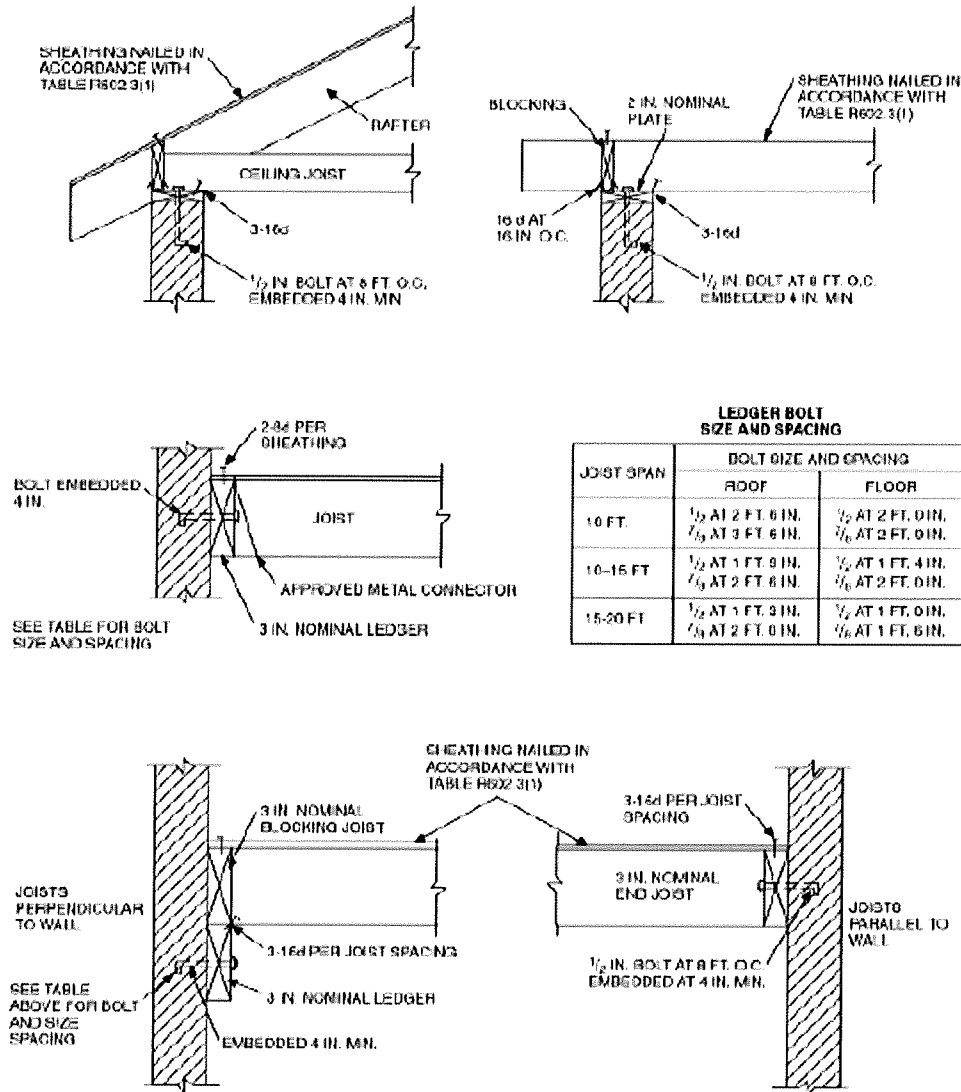
**R606.12.3.5 Lateral tie anchorage.** Standard hooks for lateral tie anchorage shall be either a 135-degree (2.4 rad) standard hook or a 180-degree (3.2 rad) standard hook.

**R606.12.4 Seismic Design Category D2.** All structures in Seismic Design Category D2 shall comply with the requirements of Seismic Design Category D1 and to the additional requirements of this section.

**R606.12.4.1 Design of elements not part of the lateral force-resisting system.** Stack bond masonry that is not part of the lateral force-resisting system shall have a horizontal cross-sectional area of reinforcement of at least 0.0015 times the gross cross-sectional area of masonry. Table R606.12.4.1 shows minimum reinforcing bar sizes for masonry walls. The maximum spacing of horizontal reinforcement shall be 24 inches (610 mm). These elements shall be solidly grouted and shall be constructed of hollow open-end units or two wythes of solid units.

**R606.12.4.2 Design of elements part of the lateral force-resisting system.** Stack bond masonry that is part of the lateral force-resisting system shall have a horizontal cross-sectional area of reinforcement of at least 0.0025 times the gross cross-sectional area of masonry. Table R606.12.4.2 shows minimum reinforcing bar sizes for masonry walls. The maximum spacing of horizontal reinforcement shall be 16 inches (406 mm). These elements shall be solidly grouted and shall be constructed of hollow open end units or two wythes of solid units.

Revise the following table:



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.  
 Note: Where bolts are located in hollow masonry, the cells in the courses receiving the bolt shall be grouted solid.

**FIGURE R606.11(1)**  
**ANCHORAGE REQUIREMENTS FOR MASONRY WALLS LOCATED IN SEISMIC DESIGN CATEGORY A, B OR C AND WHERE WIND LOADS ARE LESS THAN 30 PSF**

Delete the following table:

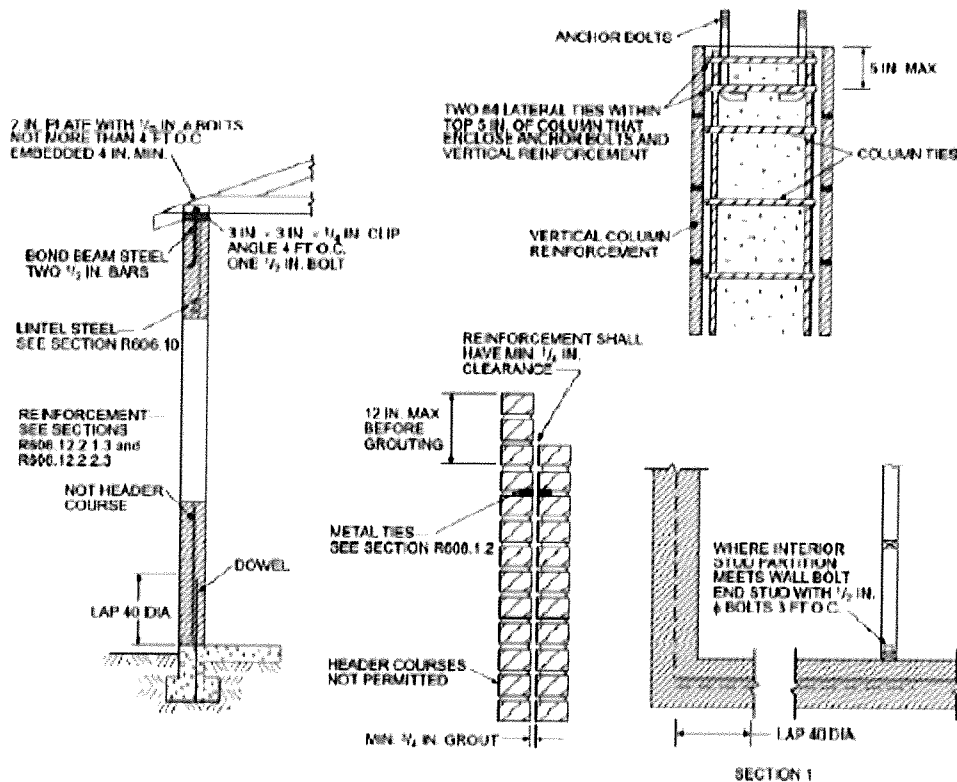
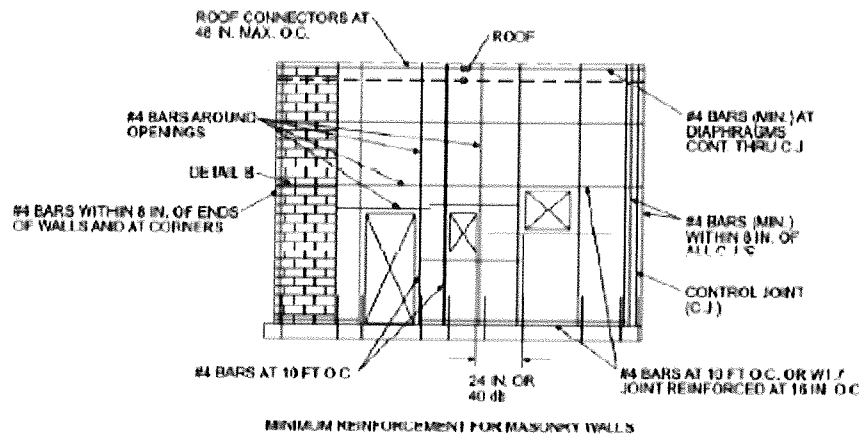


Fig. SE-1 (rev. 6-25-61) (1) (1) - 3048 (1) (1)

FIGURE R606.11(2)  
REQUIREMENTS FOR REINFORCED GROUTED MASONRY CONSTRUCTION IN SEISMIC DESIGN CATEGORY C

Delete the following table:

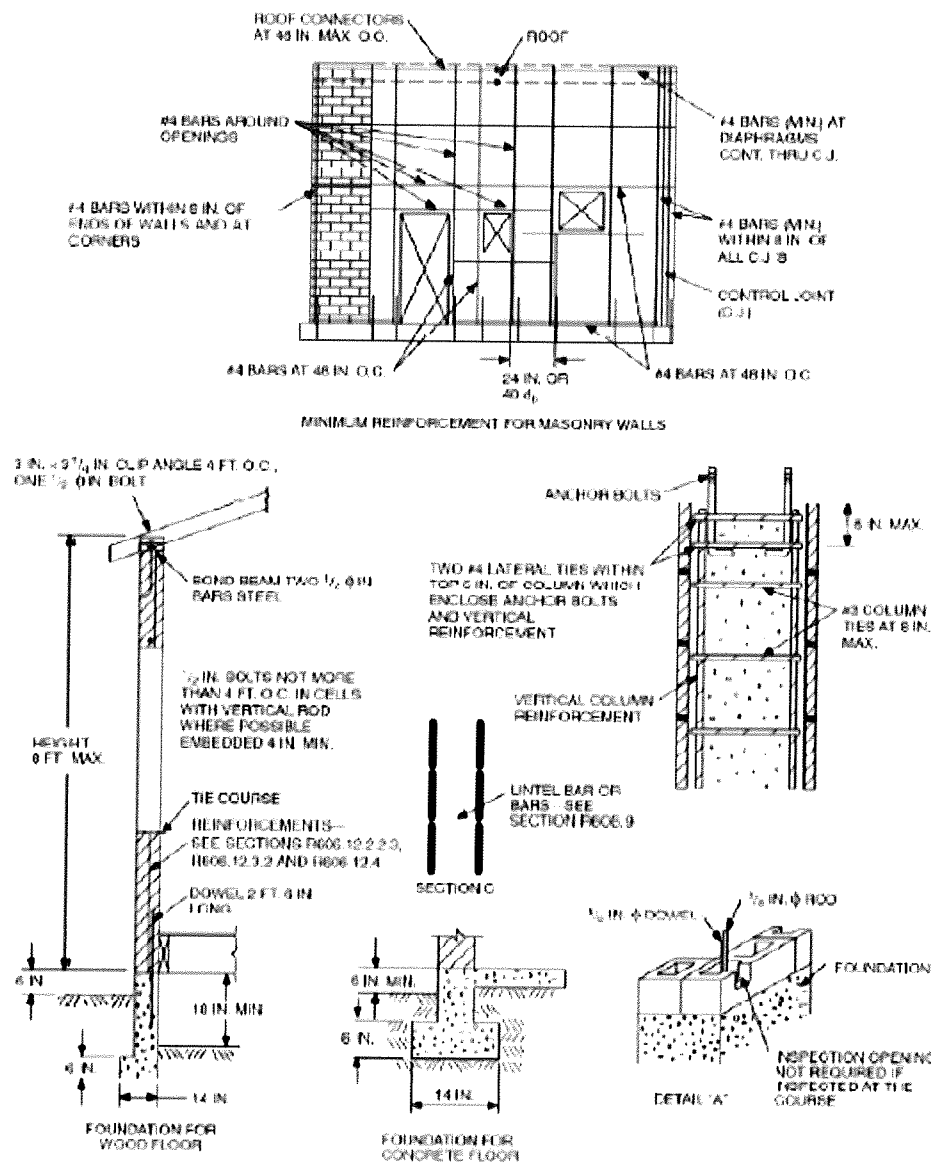


FIG. 5E. 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: A full bed joint must be provided. All cells containing vertical bars are to be filled to the top of wall and provide inspection opening as shown on detail "A".

Horizontal bars are to be laid as shown on detail "B". Tied bars are to be laid as shown on Section C.

FIGURE R606.11(3)  
REQUIREMENTS FOR REINFORCED MASONRY CONSTRUCTION IN SEISMIC DESIGN CATEGORY D<sub>1</sub>, D<sub>2</sub>, OR D<sub>3</sub>

## Delete the following tables:

TABLE R606.12.2.1  
MINIMUM SOLID WALL LENGTH ALONG EXTERIOR WALL LINES

SEISMIC DESIGN CATEGORY	MINIMUM SOLID WALL LENGTH (percent) <sup>a</sup>		
	One story or top story of two story	Wall supporting light-framed second story and roof	Wall supporting masonry second story and roof
Townhouses in C	20	25	30
D <sub>s</sub> or D <sub>1</sub>	25	NP	NP
D <sub>2</sub>	30	NP	NP

NP = Not permitted, except with design in accordance with the International Building Code.

a. For all walls, the minimum required length of solid walls shall be based on the table percent multiplied by the dimension parallel to the wall direction under consideration, of a rectangle inscribing the overall building plan.

TABLE R606.12.4.1  
MINIMUM REINFORCING FOR STACKED BONDED MASONRY WALLS IN SEISMIC DESIGN CATEGORY D<sub>s</sub>

NOMINAL WALL THICKNESS (inches)	MINIMUM BAR SIZE SPACED AT 24 INCHES
6	#4
8	#5
10	#5
12	#6

For SI: 1 inch = 25.4 mm.

TABLE R606.12.3.2  
MINIMUM DISTRIBUTED WALL REINFORCEMENT FOR BUILDING ASSIGNED TO SEISMIC DESIGN CATEGORY D<sub>s</sub> or D<sub>1</sub>

NOMINAL WALL THICKNESS (inches)	MINIMUM SUM OF THE VERTICAL AND HORIZONTAL REINFORCEMENT AREAS <sup>a</sup> (square inches per foot)	MINIMUM REINFORCEMENT AS DISTRIBUTED IN BOTH HORIZONTAL AND VERTICAL DIRECTIONS <sup>b</sup> (square inches per foot)	MINIMUM BAR SIZE FOR REINFORCEMENT SPACED AT 48 INCHES
6	0.125	0.047	#4
8	0.183	0.064	#5
10	0.231	0.081	#6
12	0.279	0.098	#6

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 square inch per foot = 2064 mm<sup>2</sup>/m.

a. Based on the minimum reinforcing ratio of 0.002 times the gross cross sectional area of the wall.

b. Based on the minimum reinforcing ratio each direction of 0.0007 times the gross cross sectional area of the wall.

TABLE R606.12.4.2  
MINIMUM REINFORCING FOR STACKED BONDED MASONRY WALLS IN SEISMIC DESIGN CATEGORY D<sub>2</sub>

NOMINAL WALL THICKNESS (inches)	MINIMUM BAR SIZE SPACED AT 16 INCHES
6	#4
8	#5
10	#5
12	#6

For SI: 1 inch = 25.4 mm.

**R612.6 Wind-borne debris protection.** Protection of exterior windows and glass doors in buildings located in windborne debris regions shall be in accordance with Section R301.2.1.2.

**R612.6.1 Fenestration testing and labeling.** Fenestration shall be tested by an *approved* independent laboratory, listed by an *approved* entity, and bear a label identifying manufacturer, performance characteristics, and *approved* inspection agency to indicate compliance with the requirements of the following specification:

1. ASTM E 1886 and ASTM E 1996; or
2. AAMA 506.

**R613.2 Applicability limits.** The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 120 miles per hour (54 m/s), Exposure A or B or 110 miles per hour (49 m/s) Exposure C, and a maximum ground snow load of 70 pounds per foot (3.35 kPa), and Seismic Design Categories A, B and C.

Revise the following table:

TABLE R702.3.7  
SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAMED GYPSUM BOARD DIAPHRAGM CEILING ASSEMBLIES

MATERIAL	THICKNESS OF MATERIAL (min.) (inch)	SPACING OF FRAMING MEMBERS (max.) (inch)	SHEAR VALUE <sup>a, b</sup> (plf of ceiling)	MINIMUM FASTENER SIZE <sup>c, d</sup>
Gypsum board	1/2	16 o.c.	90	5d cooler or wallboard nail; 1 3/8-inch long; 0.086-inch shank; 1 1/64-inch head
Gypsum board	1/2	24 o.c.	70	5d cooler or wallboard nail; 1 3/8-inch long; 0.086-inch shank; 1 1/64-inch head

For SI: 1 inch = 25.4 mm, 1 pound per linear foot = 1.488 kg/m.

a. Values are not cumulative with other horizontal diaphragm values and are for short term loading caused by wind or seismic loading. Values shall be reduced 25 percent for normal loading.

b. Values shall be reduced 50 percent in seismic Design Categories D0, D1, D2 and D3.

c. 1 3/8-inch, #6 Type S or W screws may be substituted for the listed nails.

d. Fasteners shall be spaced not more than 7 inches on center at all supports, including perimeter blocking, and not less than 3/4 inch from the edges and ends of the gypsum board.

**R703.7 Stone and masonry veneer, general.** Stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. These veneers installed over a backing of wood or cold-formed steel shall be limited to the first story above-grade plane and shall not exceed 5 inches (127 mm) in thickness. See Section R602.10 for wall bracing requirements for masonry veneer for wood framed construction and Section R603.9.5 for wall bracing requirements for masonry veneer for cold-formed steel construction.

**Exceptions:**

1. For all buildings in Seismic Design Categories A, B and C, exterior stone or masonry veneer, as specified in Table R703.7(1), with a backing of wood or steel framing shall be permitted to the height specified in Table R703.7(1) above a noncombustible foundation.
2. For detached one- or two-family dwellings in Seismic Design Categories D0, D1 and D2, exterior stone or masonry veneer, as specified in Table R703.7(2), with a backing of wood framing shall be permitted to the height specified in Table R703.7(2) above a noncombustible foundation.

Revise the following table:

TABLE R703.7(1)  
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS,  
WOOD OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD OR STEEL- FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION <sup>a</sup> (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf) <sup>b</sup>	WOOD OR STEEL- FRAMED STORY
A or B	Steel: 1 or 2 Wood: 1, 2 or 3	30	5	50	all
C	1	30	5	50	1 only
	2	30	5	50	top
	Wood only: 3	30	5	50	bottom
					top
					middle

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa.

a. An additional 8 feet is permitted for gable end walls. See also story height limitations of Section R301.3.

b. Maximum weight is installed weight and includes weight of mortar, grout, lath and other materials used for installation. Where veneer is placed on both faces of a wall, the combined weight shall not exceed that specified in this table.

Delete the following table:

TABLE R703.7(2)  
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS,  
ONE- AND TWO-FAMILY DETACHED DWELLINGS, WOOD FRAMING, SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub>, AND D<sub>2</sub>

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES <sup>a</sup>	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf) <sup>b</sup>
D <sub>0</sub>	1	20 <sup>c</sup>	4	40
	2	20 <sup>c</sup>	4	40
	3	30 <sup>d</sup>	4	40
D <sub>1</sub>	1	20 <sup>c</sup>	4	40
	2	20 <sup>c</sup>	4	40
	3	20 <sup>c</sup>	4	40
D <sub>2</sub>	1	20 <sup>c</sup>	3	30
	2	20 <sup>c</sup>	3	30

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.

a. Cripple walls are not permitted in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub>.

b. Maximum weight is installed weight and includes weight of mortar, grout and lath, and other materials used for installation.

c. The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. See also story height limitations of Section R301.3.

d. The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. See also story height limitations of Section R301.3.

**R703.7.1 Interior veneer support.** Veneers used as interior wall finishes shall be permitted to be supported on wood or cold-formed steel floors that are designed to support the loads imposed.

**R703.7.2 Exterior veneer support.** Except in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>, ~~exterior~~ Exterior masonry veneers having an installed weight of 40 pounds per square foot (195 kg/m<sup>2</sup>) or less shall be permitted to be supported on wood or cold-formed steel construction. When masonry veneer supported by wood or cold-formed steel construction adjoins masonry veneer supported by the foundation, there shall be a movement joint between the veneer supported by the wood or cold-formed steel construction and the veneer supported by the foundation. The wood or cold-formed steel construction supporting the masonry veneer shall be designed to limit the deflection to 1/600 of the span for the supporting members. The design of the wood or cold-formed steel construction shall consider the weight of the veneer and any other loads.

**R703.7.4.1 Size and spacing.** Veneer ties, if strand wire, shall not be less in thickness than No. 9 U.S. gage [(0.148 inch) (4 mm)] wire and shall have a hook embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by [(0.0299 inch) (0.76 mm)] 7/8 inch (22 mm) corrugated. Each tie shall support not more than 2.67 square feet (0.25 m<sup>2</sup>) of wall area and shall be spaced not more than 32 inches (813 mm) on center horizontally and 24 inches (635 mm) on center vertically.

**Exception:** ~~In Seismic Design Category D<sub>0</sub>, D<sub>1</sub> or D<sub>2</sub> or townhouses in Seismic Design Category C or in~~ In wind areas of more than 30 pounds per square foot pressure (1.44 kPa), each tie shall support not more than 2 square feet (0.2 m<sup>2</sup>) of wall area.



Revise the following table:

TABLE R703.7.4  
TIE ATTACHMENT AND AIR SPACE REQUIREMENTS

BACKING AND TIE	MINIMUM TIE	MINIMUM TIE FASTENER <sup>a</sup>	AIR SPACE	
Wood stud backing with corrugated sheet metal	22 U.S. gage (0.0299 in.) × 1/4 in. wide	8d common nail <sup>b</sup> (2 1/2 in. × 0.131 in.)	Nominal 1 in. between sheathing and veneer	
Wood stud backing with metal strand wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	8d common nail <sup>b</sup> (2 1/2 in. × 0.131 in.)	Minimum nominal 1 in. between sheathing and veneer	Maximum 4 1/2 in. between backing and veneer
Cold-formed steel stud backing with adjustable metal strand wire	W1.7 (No. 9 U.S. gage; 0.148 in.) with hook embedded in mortar joint	No. 10 screw extending through the steel framing a minimum of three exposed threads	Minimum nominal 1 in. between sheathing and veneer	Maximum 4 1/2 in. between backing and veneer

For SI, 1 inch = 25.4 mm.

a. In Seismic Design Category D<sub>0</sub>, D<sub>1</sub> or D<sub>2</sub>, the minimum tie fastener shall be an 8d ring-shank nail (2 1/2 in. × 0.131 in.) or a No. 10 screw extending through the steel framing a minimum of three exposed threads.

b. All fasteners shall have rust-inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion.

**R803.1 Lumber sheathing.** Allowable spans for lumber used as roof sheathing shall conform to Table R803.1. Spaced lumber sheathing for wood shingle and shake roofing shall conform to the requirements of Sections R905.7 and R905.8. Spaced lumber sheathing is not allowed in Seismic Design Category D<sub>2</sub>.

**R1001.3 Seismic reinforcing.** Masonry or concrete chimneys in Seismic Design Category D<sub>0</sub>, D<sub>1</sub> or D<sub>2</sub> shall be reinforced. Reinforcing shall conform to the requirements set forth in Table R1001.1 and Section R609, Grouted Masonry.

**R1001.3.1 Vertical reinforcing.** For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars shall be placed between wythes of solid masonry or within the cells of hollow unit masonry and grouted in accordance with Section R609. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be provided for each additional flue incorporated into the chimney or for each additional 40 inches (1016 mm) in width or fraction thereof.

**R1001.3.2 Horizontal reinforcing.** Vertical reinforcement shall be placed within 1/4 inch (6 mm) ties, or other reinforcing of equivalent net cross-sectional area, placed in the bed joints according to Section R607 at a minimum of every 18 inches (457 mm) of vertical height. Two such ties shall be installed at each bend in the vertical bars.

**R1001.4 Seismic anchorage.** Masonry or concrete chimneys in Seismic Design Category D<sub>0</sub>, D<sub>1</sub> or D<sub>2</sub> shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements of Section R1001.4.1.

**R1001.4.1 Anchorage.** Two 3/16-inch by 1-inch (5 mm by 25 mm) straps shall be embedded a minimum of 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to a minimum of four floor ceiling or floor joists or rafters with two 1/2-inch (13 mm) bolts.

**R1002.4 Seismic reinforcing.** In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>, masonry heaters shall be anchored to the masonry foundation in accordance with Section R1003.3. Seismic reinforcing shall not be required within the body of a masonry heater whose height is equal to or less than 3.5 times its body width and where the masonry chimney serving the heater is not supported by the body of the heater. Where the masonry chimney shares a common wall with the facing of the masonry heater, the chimney portion of the structure shall be reinforced in accordance with Section R1003.

**R1003.3 Seismic reinforcing.** Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required in this chapter. In Seismic Design Category D0, D1 or D2 masonry and concrete chimneys shall be reinforced and anchored as detailed in Section R1003.3.1, R1003.3.2 and R1003.4. In Seismic Design Category A, B or C, reinforcement and seismic anchorage is not required.

**R1003.3.1 Vertical reinforcing.** For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars, anchored in the foundation, shall be placed in the concrete, or between wythes of *solid masonry*, or within the cells of hollow unit masonry, and grouted in accordance with Section R609.1.1. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be installed for each additional 40 inches (1016 mm) in width or fraction thereof.

**R1003.3.2 Horizontal reinforcing.** Vertical reinforcement shall be placed enclosed within 1/4 inch (6 mm) ties, or other reinforcing of equivalent net cross-sectional area, spaced not to exceed 18 inches (457 mm) on center in concrete, or placed in the bed joints of unit masonry, at a minimum of every 18 inches (457 mm) of vertical height. Two such ties shall be installed at each bend in the vertical bars.

**R1003.4 Seismic anchorage.** Masonry and concrete chimneys and foundations in Seismic Design Category D0, D1 or D2 shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above *grade*, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements in Section R1003.4.1.

**R1003.4.1 Anchorage.** Two 3/16-inch by 1-inch (5 mm by 25 mm) straps shall be embedded a minimum of 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to a minimum of four floor joists with two 1/2-inch (13 mm) bolts.

Revise the following table:

**TABLE R1001.1**  
**SUMMARY OF REQUIREMENTS FOR MASONRY FIREPLACES AND CHIMNEYS**

ITEM	LETTER <sup>a</sup>	REQUIREMENTS
Hearth slab thickness	A	4"
Hearth extension (each side of opening)	B	8" fireplace opening < 6 square foot. 12" fireplace opening ≥ 6 square foot.
Hearth extension (front of opening)	C	16" fireplace opening < 6 square foot. 20" fireplace opening ≥ 6 square foot.
Hearth slab reinforcing	D	Reinforced to carry its own weight and all imposed loads.
Thickness of wall of firebox	E	10" solid brick or 8" where a firebrick lining is used. Joints in firebrick 1/4" maximum.
Distance from top of opening to throat	F	8"
Smoke chamber wall thickness Unfired walls	G	6" 8"
Chimney Vertical reinforcing <sup>b</sup>	H	Four No. 4 full-length bars for chimney up to 40" wide. Add two No. 4 bars for each additional 40" or fraction of width or each additional flue.
Horizontal reinforcing	J	1/4" ties at 18" and two ties at each bend in vertical steel.
Bond beams	K	No specified requirements.
Fireplace lintel	L	Noncombustible material.
Chimney walls with flue lining	M	Solid masonry units or hollow masonry units grouted solid with at least 4-inch nominal thickness.
Distances between adjacent flues	—	See Section R1003.13.
Effective flue area (based on area of fireplace opening)	P	See Section R1003.15.
Clearances Combustible material Mantel and trim Above roof	R	See Sections R1001.11 and R1003.18. See Section R1001.11, Exception 4. 3' at roofline and 2' at 10'.
<del>Anchorage<sup>b</sup> Strap Number Embedment into chimney Fasten to Notes</del>	<del>—</del>	<del>1/16" × 1/8" Two 12" hooked around outer bar with 6" extension. Joists Two 1/2" diameter.</del>
Footing Thickness Width	T	12" min. 6" each side of fireplace wall.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>.

**Note:** This table provides a summary of major requirements for the construction of masonry chimneys and fireplaces. Letter references are to Figure R1001.1, which shows examples of typical construction. This table does not cover all requirements, nor does it cover all aspects of the indicated requirements. For the actual mandatory requirements of the code, see the indicated section of text.

a. The letters refer to Figure R1001.1.

b. Not required in Seismic Design Category A, B or C.

### **Proposed Code Change – Need and Reason**

Minnesota is not in a high wind or seismic zone. Having these and other rules that are not applicable is unnecessary. Furthermore, because of the volume of rules that exist for these issues, it can and does happen that portions of the seismic or high wind rules are enforced because people do not go all the way to the beginning of a section but pick out bits and pieces of the code. There are more than forty pages dedicated to requirements not applicable to Minnesota. Reading through the proposed deletions should make it readily apparent how confusing the additional language can be. Eliminating this language will make enforcement and compliance with the applicable rules easier and more uniform.

### **Proposed Code Change – Cost/Benefit Analysis**

This code change will reduce the cost of construction because it will reduce the potential for errors involving the application or rules when they don't apply.

## Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

☒ change language contained in a published code book? If so, list section(s).

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☒ delete language contained in a published code book? If so, list section(s).

☒ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

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**Subp. 4. Seismic or earthquake provisions.**

☐ neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.

No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

No

4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.

No

5. Who are the parties affected or segments of industry affected by this proposed code change?

Code officials, designers, contractors, homeowners, anyone using the residential code.

6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.

No

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.

No